VL2B™ *and VL2C*™

Spot Luminaire

02.9631.0010

15 Jan 1997



Service Manual

VARI*LITE®

The Automated Lighting Company

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France Design Reg. No. 95-1125;

Germany Utility Model Reg. No. G9312884.3; G9314158.5; German Design Reg. No. M9501553.7; M9407689.8;

Hong Kong Patents No. 965/1990; 285/1987;

Japan Patents No. 2,059,669; 2,055,324; 2,002,168; 1,966,525; 1,889,481; 1,792,721; 1,770,241; 1,742,923; 1,723,825; 1,683,007; 1,533,011; Japan Design Reg. No. 970,593; 956,262; 947,552;

Korea Patents No. 92,269; 76,310; 47,673; 42,641; 42,640; 42,639; Korea Design Reg. No. 175,178;

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VL2B™ and *VL2C*™ Spot Luminaire Service Manual

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Foreword

This technical manual is confidential property of Vari-Lite, Inc. All information contained herein is the sole and exclusive property of Vari-Lite, Inc and may not be used, disclosed, or reproduced in any manner without the prior written consent of Vari-Lite, Inc.

This manual supersedes all existing **VL2B** and **VL2C** luminaire information and procedures. The following Vari-Lite technical publications are superseded by this service manual and should be discarded.

02.9631.0002 VL2 Illustrated Parts Breakdown

02.9631.0003 VL2 Maintenance Procedures

These documents may also be contained in the **Series 200** System Notebook.

This manual incorporates distinct type styles to differentiate between certain types of text. These styles are defined as follows:

Boldface	Trademarked or registered product.	Example: **Artisan**® control console
Italics	Words with specialized meanings such as luminaire attributes.	Example: Luminaire *intensity*

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VARI*LITE®
The Automated Lighting Company

FAX

TO: Product Support Department Manager

201 Regal Row
Dallas, Texas 75247
USA

COMPANY: Vari-Lite International

FAX NUMBER: 214-630-5867

RE: Comments to ***VL2B*** **and** ***VL2C*** **Wash Luminaire Service Manual (02.9631.0010)**

FROM:

DATE:

PAGE 1 OF 1

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Comments:

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Chapter 1. Introduction

This chapter contains the following sections:

1.1 General Information

1.2 Equipment Description

1.3 Photometric Data

1.4 Location of Major Luminaire Components

1.5 Principles of Operation

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1.1 General Information

1.1.1 About This Manual

This manual describes specific information regarding description and installation of the **VL2B**™ and **VL2C**™ spot luminaires. It provides test, fault isolation, and repair procedures for the purpose of general service and repair of the luminaires. The manual is intended for use by Vari-Lite personnel and by Vari-Lite's customers/clients. The following equipment items are covered in this manual:

Equipment Description	Part Number
VL2B Spot Luminaire	20.5002.0004
VL2C Spot Luminaire	20.9637.0001

Note: Some **VL2B** spot luminaires have been upgraded with **VL2C** Lamp Control Board (LCB) and Control Interface Board (CIB). These luminaires are referred to as **VL2B**+ spot luminaires. This distinction refers only to the implementation of Tech Bulletin LCB-004 and not to a separate version of luminaire. Other than the unique **VL2B**+ Form and Function Switch setting mentioned in the **Test Code Description** paragraph for Test 24 (Form and Function Test) in the Download Test section of Chapter 3, the 2B+ is not discussed in this manual.

1.1.2 Documentation

1.1.2.1 Technical Manuals

Procedures for operating and maintaining a **Series 200**™ or **Series 300**™ system are contained in **Series 200** System Manual (02.3004.0200) and various equipment manuals. Programming procedures are contained in the Operator Programming Manuals, which are kept with the console. There are currently two programming manuals: 02.3004.0010 (**Artisan**® and **mini-Artisan**® control consoles) and 02.3004.0210 (**Artisan**®**Plus**, **mini-Artisan**®**Plus**, and **mini-Artisan**®**2**).

All of the ACS equipment are contained in the ACS Equipment Service Manual (02.9623.0200). Each luminaire and console has its own service manual. Both types of **Artisan** consoles are covered in the **Artisan** Control Console Service Manual (02.9622.0101). The **mini-Artisan** consoles are covered in separate service manuals.

Procedures for inspecting and preparing equipment for shipment are found in the **Series 200** System Equipment Preparation and Inspection Procedures (02.3004.0042).

1.1.2.2 Technical Bulletins

Technical bulletins are issued from the Dallas, Texas USA office. They are updates to documentation that discuss changes to the equipment, software, and the latest available information concerning **VARI*LITE** equipment. Technical bulletins are categorized by assembly or subassembly, and identified by a number such as BFB-003 (**VL2B** Luminaire Dimmer Belt Change).

1.1.3 Maintenance Philosophy

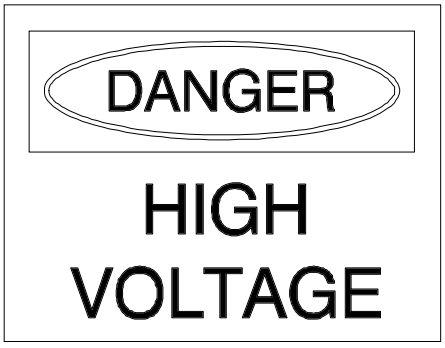
The fault isolation and maintenance sections of this manual provide a logical path of fault isolation and repair designed to return the equipment to proper operation in most cases. The fault isolation procedures for the equipment end item have been broken into two sections, which lead the technician to maintenance procedures that he/she can reasonably be expected to perform.

The criteria for separating fault isolation and maintenance procedures into two sections can be defined by Class 2 and Class 3 repairs. Class 2 repairs only require the technician to replace an end item subassembly or easily accessible component (e.g., a fuse) in order to return the equipment to proper operation. Class 2 repairs are applicable to situations in which tools and/or experience of the technician are limited, or time does not permit extensive maintenance. Class 3 repairs (identified as *Shop Only*) involve in-depth repair to subassemblies that have been identified as faulty. Class 3 repairs are applicable to situations in which tools and experience of the technician allow for more extensive procedures. In some cases, even though a technician may have the ability and resources to perform extensive repair, he/she may decide to replace the entire subassembly in order to return the equipment to proper operation more quickly. The subassembly could then be repaired at a more appropriate time.

It is extremely important to note that while many of the commonly identified solutions to equipment failure are provided in this manual, it does not cover all possible situations. Contact the appropriate Vari-Lite Support Group if you have questions or if the procedures given do not solve the problem.

1.1.4 Recommended Safety Practices

This section describes the various types of safety factors to be considered while installing and operating **VL2** luminaires.



Equipment High Voltage

All components of the **Series 200** and **300** systems use high voltage to operate. These voltages can produce death on contact. When working around or within powered components and cables, extreme caution must be used. When conditions permit, maintenance should be performed with power off.

Luminaire Hanging

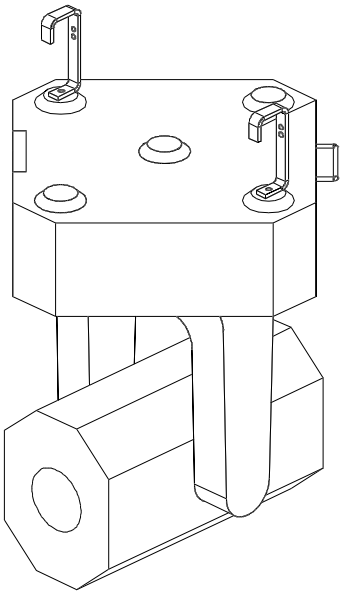
Safety is the prime consideration when hanging luminaires. Safety far outweighs any concern about operator convenience, speed of load-in or load-out, or ease of changing-out luminaires when the truss is in the air. The first consideration must be whether the truss or pipe can safely support the weight of the luminaires and repeaters. The second consideration must be whether the luminaires are securely attached so they cannot possibly come off the truss or pipe (even if the truss goes 90° from horizontal due to a failure of the chain motor or fly system). In addition to mounting hooks, all truss-mounted equipment are provided with a safety cable to prevent the equipment from falling off the truss. The safety cable is connected to the equipment's base, looped around the truss, and then reattached to the equipment base. The cable should be wound tightly, leaving as little slack as possible.

Lamp Handling

Due to the use of high power lamps (bulbs) in all **VL2** luminaires, the heat of the luminaire head can reach temperatures of around 400°F when the lamp is lit. To aid in the airflow circulation within the luminaires, after dousing the lamps, wait ten minutes before removing power to the luminaires. This will provide enough time for the equipment fan to cool off the unit, which will increase lamp life.

- When handling a lamp, use the ceramic base to hold the lamp. Do not touch the glass part of the lamp. If you touch the glass part with your fingers, wipe off the fingerprints with alcohol. Oils contained in the skin, and therefore the fingerprints, deteriorate the glass when the oils are heated causing hot spots on the glass. Lamps could explode at these hot spots.
- On occasion, lamps have exploded. Wear protective glasses whenever the covers are removed from the head of the luminaire and the lamp is exposed.
- Use care when opening and closing the rear door of the **VL2** luminaires. Any jarring of the rear door can undo the optical alignment of the lamp.
- In the event that a large quantity of luminaires need to be optically aligned, wear dark glasses during the alignment procedure to prevent eye strain. In addition, always operate the lamp in the closed housing. There is a danger of glare due to high luminance. Also, a high portion (three to five percent) of the consumed electrical power is given off in the form of ultraviolet radiation.
- When operating arc lamps, allow luminaires to operate for at least three minutes. It takes about three minutes for the fill components (mercury and halogen-metal compounds) in the lamp tubes of 250-, 400- and 600-watt lamps to vaporize completely. If the lamps are switched off earlier than three minutes, the fill components are partially vaporized. The inadequately vaporized fill components and the electrode material (tungsten) are deposited in the areas of the lamp tubes that have remained cool. As a result, the lamp tubes blacken prematurely and reduce the service lives of the lamps.
- Luminaire heads should be tilted to the horizontal position before starting lamps. The lamps generate light in an electrical discharge arc, whereby the electrons from the two electrodes excite the fill components to give off light. Because of the alternating current position, the electrons are alternately given off by the two electrodes. When a lamp is set in a vertical position, the halogen-metal compounds, which determine the color temperature of the lamp, collect at the top end of the glass envelope. When the lamp is started, color deviations occur since the concentration of halogen compounds is greater around the top electrode than the bottom electrode. In addition, the fill components that are difficult to vaporize congeal around the bottom electrode, thereby reducing the service life of the lamp.
- When system will be unattended for more than two hours, luminaire lamps should be doused. Otherwise, if system will be unattended for less than two hours, system can remain in standby.

1.2 Equipment Description



1.2.1 *VL2B*™ luminaire

The **VL2B**™ luminaire is an upgraded version of the early **VL2**® luminaire. The luminaire contains a 400 watt arc source that maintains a consistent 5000ºK color temperature and an aluminum reflector. The dichro-wheel color system produces over 120 colors. A high-speed microprocessor provides intelligent control of the luminaire's functions, which are maintained from the control console. Distortion-free images with a soft or hard beam edge are produced with a compound lens with programmable positioning, and a lens-free aperture eliminates glare. Integration of the luminaires with the **Series 200™** automated lighting system is made easy with integrated data and power connectors. Cooling for the luminaire is maintained with cooling fans that channel air through the hollow yoke. Exhaust vent baffles aid in air flow circulation and eliminate light leaks.

1.2.2 *VL2C*™ luminaire

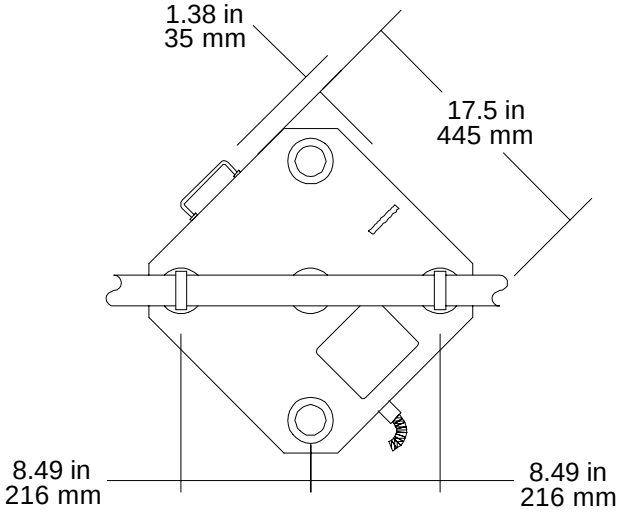
The **VL2C**™ luminaire is an upgrade to the **VL2B** luminaire. Its features are identical to those of the **VL2B** luminaire, but some of the assemblies have been altered for enhanced operation. One of the major upgrades is a 600 watt arc source and a glass reflector producing a bright 6100ºK color temperature. The source may be adjusted in the reflector to peak or flatten the projected beam field. A new power supply is supplied to energize to the new bulb. In addition, the cooling system is enhanced to aid in circulation since the bulb generates more heat. A fan board assembly is also added to help cooling. Enhanced focusing and defocusing of gobo patterns and an advanced iris motor allow fluid, controlled beam size changes at all speeds.

Refer to **Tables 1-1** and **1-2** and see **Figures 1-1** and **1-2** for an illustration and a description of the **VL2B** and **VL2C** luminaire head assembly and electronics chassis major assemblies.

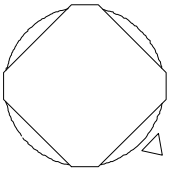
1.2.3 Dimensions and Weight

The **VL2B/VL2C** luminaire weight is 62 pounds (28 kg).

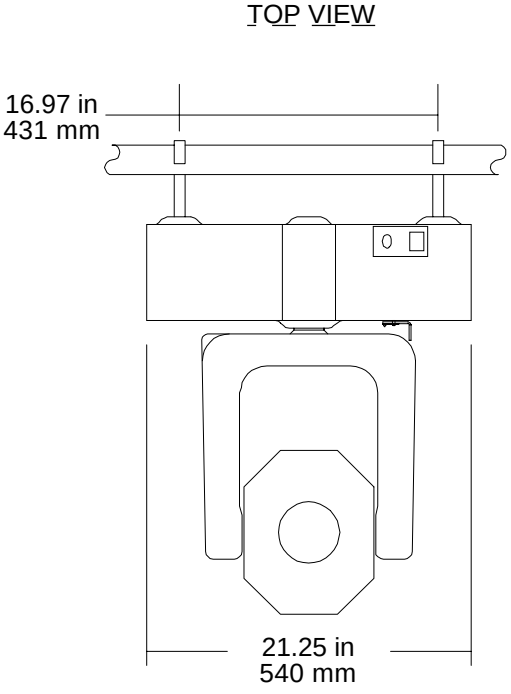
Note: Refer to **Figure 2-1** for luminaire clearance and truss hook hanging dimensions.



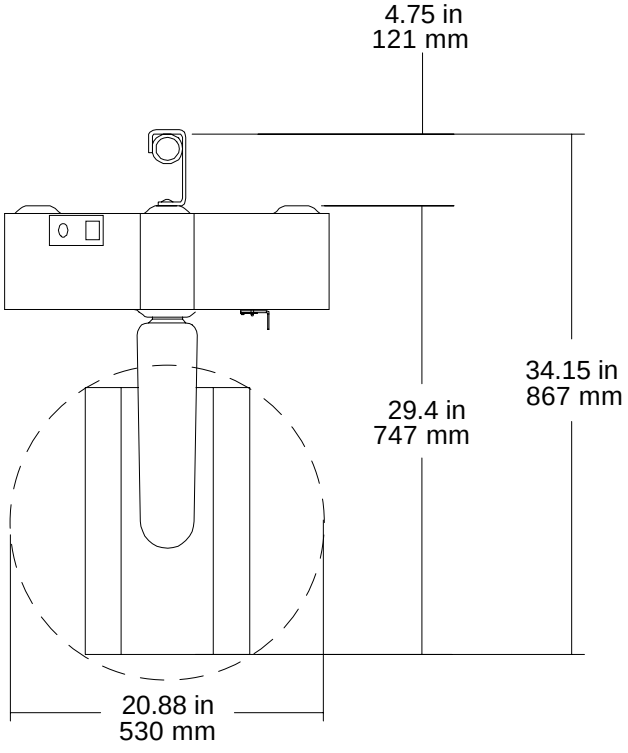
TOP VIEW



VL2B/VL2C LUMINAIRE SYMBOL



FRONT VIEW



SIDE VIEW

1.2.4 Technical Specifications

1.2.4.1 Description

Light Source

VL2B: OSRAM HTI SE 400W metal halide arc lamp, 5000°K.

VL2C: OSRAM HTI SE 600W metal halide arc lamp, 6100°K

Power Requirements

VL2B: 100 to 240VAC nominal, 50/60 Hz, 3 to 8A depending on the line voltage.

VL2C: 100 to 240VAC nominal, 50/60 Hz, 7 to 14A depending on the line voltage.

Reflector

VL2B: Aluminum ellipse, chemically brightened.

VL2C: Cold mirror coated glass.

Both have adjustable lamp mounting plate to peak or flatten projected beam field.

Cooling

Forced air

Light Output

VL2B: 900 foot-candle at 20 feet (center beam with maximum intensity).

VL2C: 1150 foot-candle at 20 feet (center beam with maximum intensity).

Control Processor

VL2B: Motorola 68000 processors operating at 8 MHz with 128kB RAM and 64kB ROM.

VL2C: Motorola 68000 processors operating at 16 MHz with 256kB RAM and 64kB ROM.

Operating Temperature

0° to 120°F (-18° to 49°C)

1.2.4.2 Programmable Functions

Color

Dichro-Wheel dichroic color changer with more than 120 colors. Internal color correction filter.

- Color change speed 0.1 second

Color Correction

3200°K preset selectable from console.

Intensity Control

Mechanical dimmer provides smooth full-field control at all light levels.

- Blackout time 0.5 second

Focus (Pan/Tilt)

Digital servo system with 80:1 speed range.

- Velocity 120 degrees per second (maximum)
  1.5 degrees per second (minimum)
- Accuracy 0.3 degree resolution
- Pan 360 degrees in 3.0 seconds
- Tilt 270 degrees in 2.7 seconds

Beam Diffuser

Beam edge variable by moving lens, from sharp to soft in 0.6 second.

Beam Size Control

Beam size variable by mechanical iris.

- Beam angle: 5 to 24 degrees
- Change time: 0.3 second

Gobo

Rotating wheel with nine interchangeable gobos

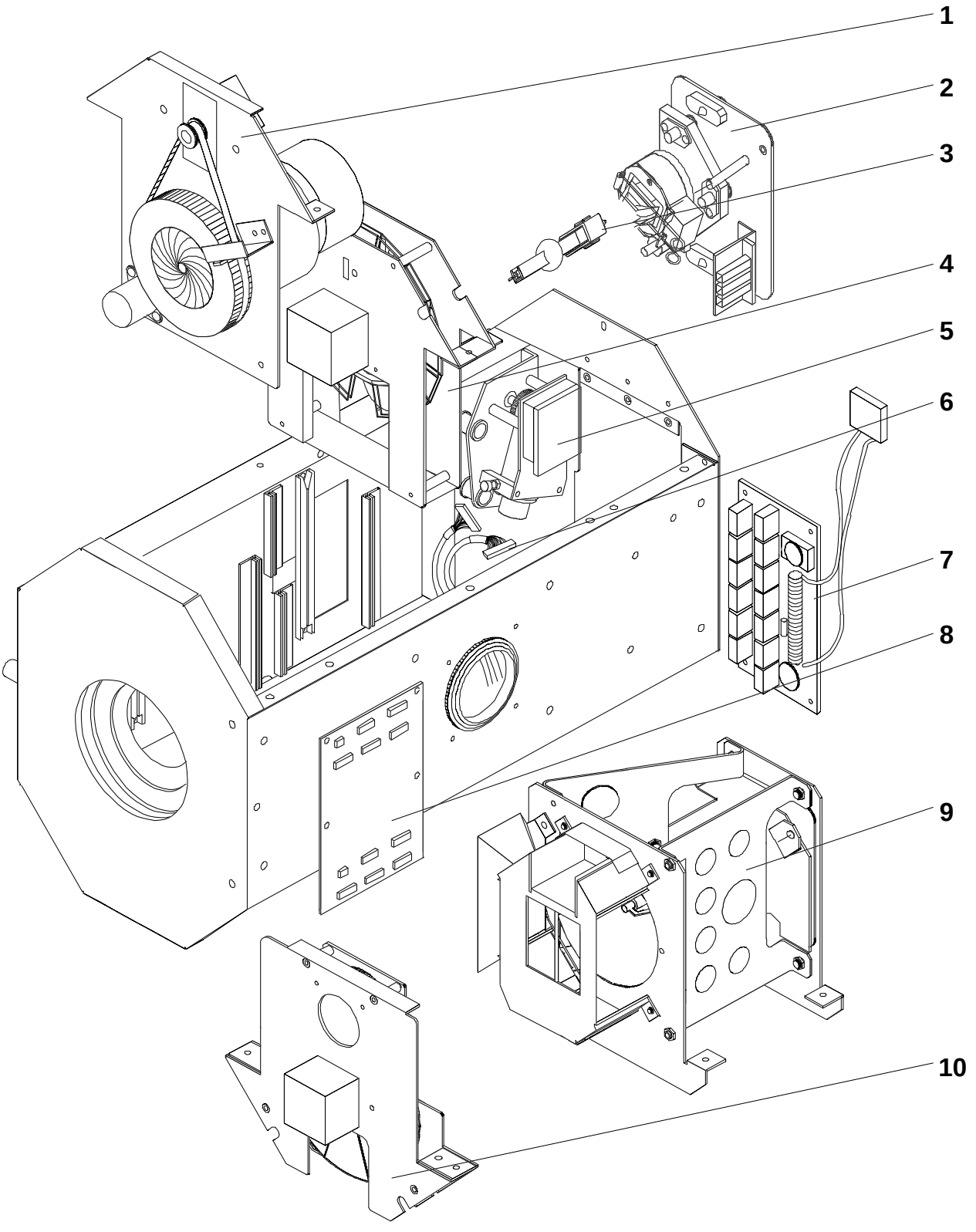
- Change time: 0.1 second

1.3 Location of Major Luminaire Components

1.3.1 Head Components

Ref. No.	Name	Description
1	Brightness/ Focus Bulkhead	Motorized, belt-driven iris controls intensity. Iris leaves are reflective on one side to resist heat of light beam. Motorized lens mount adjusts focal properties of lamp/lens configuration to control beam edge sharpness softness.
2	Lamp Focus Assembly	Manual adjustments tilt mounting plate vertically and horizontally to center the beam, and moves lamp back-and-forth in the reflector to adjust divergence.
3	Lamp	**VL2B** Luminaire: OSRAM model HTI™ 400W S/E metal halide arc light source (5000ºK). Operates at 400 watts for up to 250 hours. **VL2C** luminaire: OSRAM model HTI™ 600W S/E metal halide arc light source (6100ºK). Operates at 600 watts for up to 250 hours
4	Color Filter Bulkhead	Two motor-driven filter wheels provide rapid, discrete color change.
5	Tilt Mechanism	Drives belt driven pulley to tilt luminaire head. Interconnected to yoke termination board for power and data.
6	Yoke Cable Assembly	Provides power to yoke termination board, contains high-voltage lamp cables, and also contains ground cable.
7	Ignitor Board Assembly	Develops high-voltage pulse for arc lamp.
8	Yoke Termination Board	Provides motor and sensor wiring connections to yoke cable assembly.
9	Reflector Assembly	**VL2B** Luminaire: Ellipsoidal aluminum reflector directs light from arc lamp forward through color filters, gobo/beam projector, and dimming iris. **VL2C** Luminaire: Cold mirror coated glass directs light from arc lamp forward through color filters, gobo/beam projector, and dimming iris.
10	Gobo/Beam Projector	Motorized, cable-driven iris mounted at focal plane controls beam size. Iris leaves and gobos are reflective on one side to resist heat of light beam. Motor-driven gobo wheel provides for projection of various patterns. Gobos snap in and out easily.

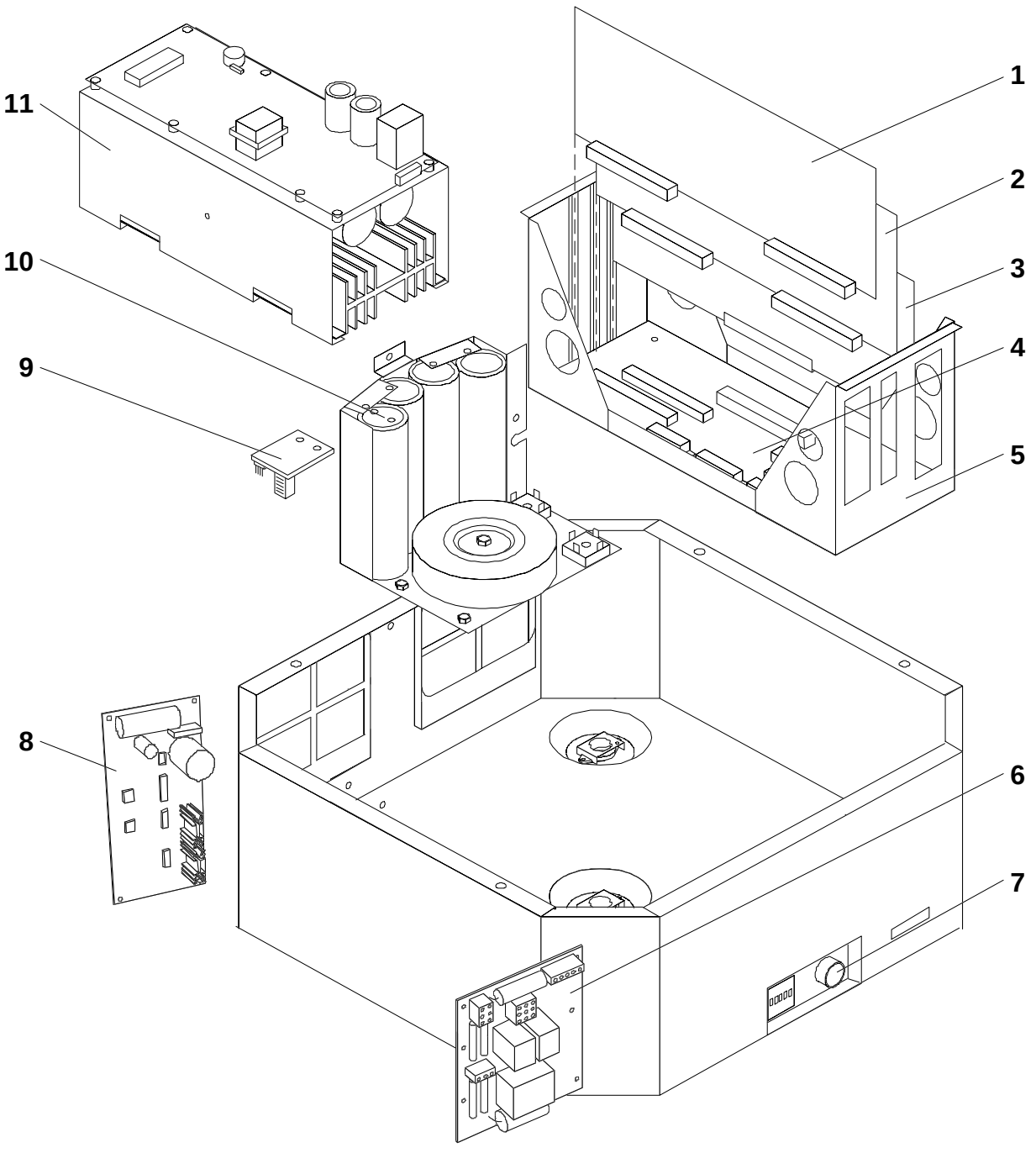
Head Components (continued)



1.3.2 Electronic Chassis Components

Figure 1-2 Ref. No.	Name	Function
1	Control Interface Board	Controls stepper motors, system timing, pan/tilt, shaft encoder interface, and sensor inputs.
2	Lamp Control Board	Controls various luminaire functions, communicates with console using modem board, and stores cue data using upgrade board.
3	Low Voltage Supply Board	Regulates DC power Includes servo amplifiers for pan and tilt.
4	Motherboard PCB Assembly	Located at bottom of card cage. Routes power to the luminaire electrical components.
5	Electronics Card Cage	Houses control electronics, cue memory, data communications circuits, and power regulator PCBs. Motherboard is held on bottom of card cage.
6	Voltage Selector Board	Senses amplitude of AC input power (86 to 130 or 170 to 260 VAC) and switches transformer primaries in series (220 mode) or parallel (110 mode).
7	Input Panel	Contains hour meter, input connector and thumbwheel switch. Thumbwheel sets luminaire's address.
8	Fan Drive Plus Board (**VL2C** Only)	Creates pseudo-sine wave for fan to increase fan speed rpm. Fan runs at one speed at 60 Hz but runs slower at lower frequencies. Board allows fan to run at higher speed without slowing down at lower frequencies. Used only in **VL2C** luminaires.
9	DC-to-DC Converter Board (**VL2C** Only)	Board provides isolated voltage to drive fan drive plus board. Voltage for fan drive plus board cannot be referenced to digital ground. DC-to-DC board is installed over transformer capacitors. Used only in **VL2C** luminaires.
10	Transformer Assembly	Provides unregulated DC power from AC input for use by lamp power supply assembly and low voltage supply PCB assembly.
11	Arc Power Supply	Provides AC power for lamp. **VL2B** luminaire arc power supply operates at 400 watts. **VL2C** luminaire arc power supply operates at 600 watts
	Pan Mechanism (Chassis Lid)	Drives belt-driven pulley to pan luminaire head. Interconnected to motherboard for power and data.
	Cooling Fan (Chassis Lid)	Forces cooling air though hollow yoke arms to lamp. Blows air directly across lamp for maximum cooling. Runs at higher rpm when used in conjunction with fan drive plus board modification used on **VL2C** luminaires.

Electronic Chassis Components (continued)



1.4 Photometric Data

The chart below represents beam specifications for the **VL2B/VL2C** luminaire. Specifications are given for spot diffusion and flood diffusion.

***VL2B/VL2C* Wash Luminaire with 400W & 600W Metal Hallide Lamp**						
LENS and LAMP SETTINGS	**DIFFUSION**	**CANDELA (cd)**	**BEAM ANGLE (degrees)**	**BEAM DIAMETER TN***	**FIELD ANGLE (degrees)**	**FIELD DIAMETER TN***
HTI 400 W/SE (Narrow Beam)	Spot	876,000	4	.07	11	.19
	Flood	126,400	11	.19	24	.42
HTI 400 W/SE (Wide Beam)	Spot	235,200	9	.16	20	.35
	Flood	81,200	14	.24	29	.52
HTI 600 W/SE (Narrow Beam)	Spot	606,710	6	.1	8	.14
	Flood	332,903	17	.3	23	.44
HTI 600 W/SE (Wide Beam)	Spot	365,040	9	.16	18	.32
	Flood	201,240	10	.17	25	.44

* Multiply distance by Tn to determine coverage.

To calculate Illuminance (I) at a specific distance (D); $I = \frac{cd}{D^2}(\cos\theta)$

1.5 Principles of Operation

1.5.1 Operation Overview

Operation of the luminaires is provided by software run within the luminaire. The processing functions are primarily carried out on the following three printed circuit boards (PCBs) located in the chassis card cage assembly:

- Lamp control board
- Control interface board
- Low voltage supply.

The voltage selector board (VSB) senses the incoming voltage and automatically configures the power supplies for either 110 or 220 VAC. Lamp power is provided by the arc power supply (APS). From the low voltage supply board, the voltage is channeled to the main mechanical subassemblies.

- Brightness focus bulkhead.
- Color filter bulkhead
- Gobo/beam projector
- Lamp focus assembly
- Pan/tilt mechanism.

1.5.2 Operation Description

1.5.2.1 Electronics Components

Voltage Selector Board (VSB)

The voltage selector board senses the amplitude of the AC input power and switches the transformer primaries in series (for 220 mode) or parallel (for 110 mode). When in 110 mode, the voltage selector board accepts an incoming voltage of between 85 and 130 volts. When in 220 mode, the voltage selector board accepts an incoming voltage of between 170 and 260 volts.

Transformer/Capacitor Assembly (XFMR)

This assembly provides unregulated DC power for use by the lamp power supply assembly and low voltage supply board. Additionally, a DC-to-DC converter PCB is connected to this assembly to provide an isolated voltage for the fan drive plus PCB.

Low Voltage Supply (LVS2)

The low voltage supply PCB provides DC voltage regulation for the luminaire.

Motherboard PCB Assembly (MBD2)

The motherboard routes power to the luminaire electrical components.

Lamp Control Board (LCB)

The lamp control board controls various luminaire functions, communicates with the console using the modem board, and stores cue data using the upgrade board.

The lamp control board utilizes two EPROM devices to store instructions for a power-up self-test procedure.

An on-board, 3.6 VDC battery provides back-up power to random access memory devices during power fluctuations and times when AC input power to luminaire is removed. A voltage detector signals the main lamp control board to halt microprocessor operations during low-voltage conditions.

Control Interface Board (CIB)

The CIB contains the circuitry to interface the microprocessor based instructions with the following functional groups:

- Stepper motor control ports
- System timing control
- Pan and tilt control
- Shaft encoder interface
- Sensor inputs.

Arc Power Supply (APS)

The arc power supply provides controlled square-wave current, ignition voltage, and operating voltage required by the arc lamp. It consists of four subassemblies: chassis assembly, control PCB, heatsink assembly, switch PCB.

Low Voltage Supply (LVS)

The Low Voltage Supply PCB provides DC voltage regulation for the luminaire.

1.5.2.2 Bulkhead Assemblies

Yoke Cable Assembly and Yoke Termination Board

Located in the luminaire head, the yoke termination PCB connects to the yoke cables via one 26-pin and one 24-pin connector. The luminaire power is routed to the yoke termination PCB and then routed to the head electrical assemblies.

Ignitor Board Assembly (IGN2)

The ignitor PCB assembly is mounted remotely from the arc power supply, inside the luminaire head. The power supply is interconnected through the yoke cable assembly via high voltage cables. An ignitor PCB circuit generates up to 3300 VDC, which is applied to the spark gap. When the 2.5 kV spark gap fires, the pulse is stepped-up to 16 kV and the start pulse is applied to the arc lamp.

Brightness/Focus Bulkhead (BFB)

The brightness/focus bulkhead is a dual-purpose bulkhead. It contains a brightness iris that is used to dim the apparent brightness of the projected light beam from the luminaire. The bulkhead also contains the focus tube and lens.

Color Filter Bulkhead (CFB)

The color filter bulkhead contains the two dichro-color wheels that enable color projection and changes.

Gobo/Beam Projector (GBP)

This assembly maintains two functions: gobos and beam projection. The gobo mechanism contains a single wheel containing up to 10 gobos (typicaly 9 gobos plus one open white location). The beam projection mechanism is a wire-belted, leafed, iris shutter operated by a single stepper motor.

Lamp Focus Assembly (LFA)

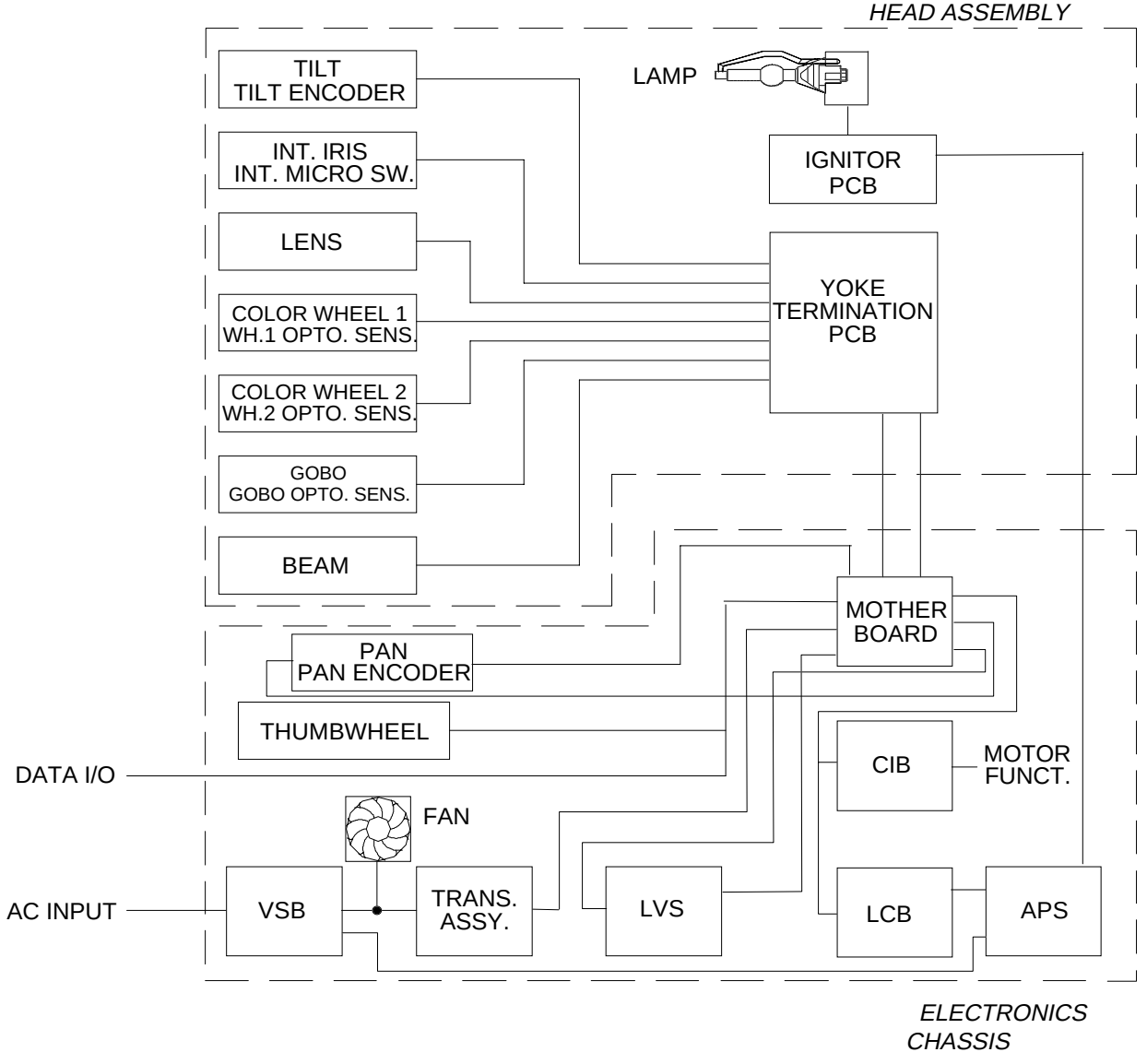
The lamp assembly contains the lamp and the lamp alignment controls. The knurled knob alignment controls aid in the redirection of the lamp in the X, Y, and Z planes.

Pan/Tilt Mechanism (PTM)

The pan/tilt mechanism is used to drive the pulleys that cause the luminaire head to pan and tilt. The same assembly is used for both pan and tilt applications.

1.5.3 Data and Power Flow Diagram

Input data and power are supplied to the luminaire via the **Series 200** connector on the electronics chassis. Power is directed to the voltage selector board (VSB). The VSB provides power to the fan, and switches the transformer primaries for the appropriate mode. The VSB also supplies power directly to the Arc Power Supply (APS). The APS supplies operating voltage for the lamp. Power is distributed to the low voltage supply, which supplies DC voltage to the control boards. Control boards receive power and data to command the main mechanical assemblies located in the luminaire head assembly.



Chapter 2. Installation and Operation

This chapter contains the following sections:

2.1 Installation

2.2 Checkout

2.3 Installing **VL2B**/**VL2C** Luminaire Accessories

2.4 Lamp Optical Alignment

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2.1 Installation

2.1.1 Luminaire Hanging

VL2B/VL2C luminaires can be hung from a truss or similar structure by one of several methods. All methods utilize hanging clamps called truss hooks. **VL2B/VL2C** luminaires have five receptacles for hook connection.

For an in-depth explanation of hanging methods, refer to **Series 200** Installation and Checkout Manual (02.9622.0010).

2.1.1.1 Luminaire-To-Luminaire Distance Requirements

Refer to the following table for **VARI*LITE** luminaire-to-luminaire distance requirements.

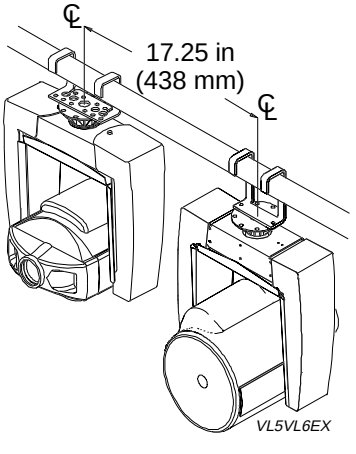
Luminaire	VL2B/ VL2C	VL4	VL5/ VL5B/ VL5Arc	VL6	VLM
VL2B/ VL2C	21.50 in. 546 mm	19.50 in. 495 mm	19.75 in. 502 mm	19.00 in. 483 mm	19.50 in. 495 mm
VL4	19.50 in. 495 mm	17.50 in. 445 mm	17.75 in. 451 mm	17.00 in. 432 mm	17.50 in. 445 mm
VL5/VL5Arc/ VL5B	19.75 in. 502 mm	17.75 in. 451 mm	18.00 in. 457 mm	17.25 in. 438 mm	17.75 in. 451 mm
VL6	19.00 in. 483 mm	17.00 in. 432 mm	17.25 in. 438 mm	16.50 in. 419 mm	17.00 in. 432 mm
VLM	19.50 in. 495 mm	17.50 in. 445 mm	17.75 in. 451 mm	17.00 in. 432 mm	17.50 in. 445 mm

Example: To find center-to-center distance between **VL5** and **VL6** luminaire:

Step 1. On chart, find **VL6** luminaire on top row and **VL5** luminaire on side row

Step 2. From **VL6** luminaire on top row follow chart down. From **VL5** luminaire on side row follow chart to right.

Step 3. Where two rows meet is correct distance (17.25 in. or 438 mm).



2.1.1.2 Clearances

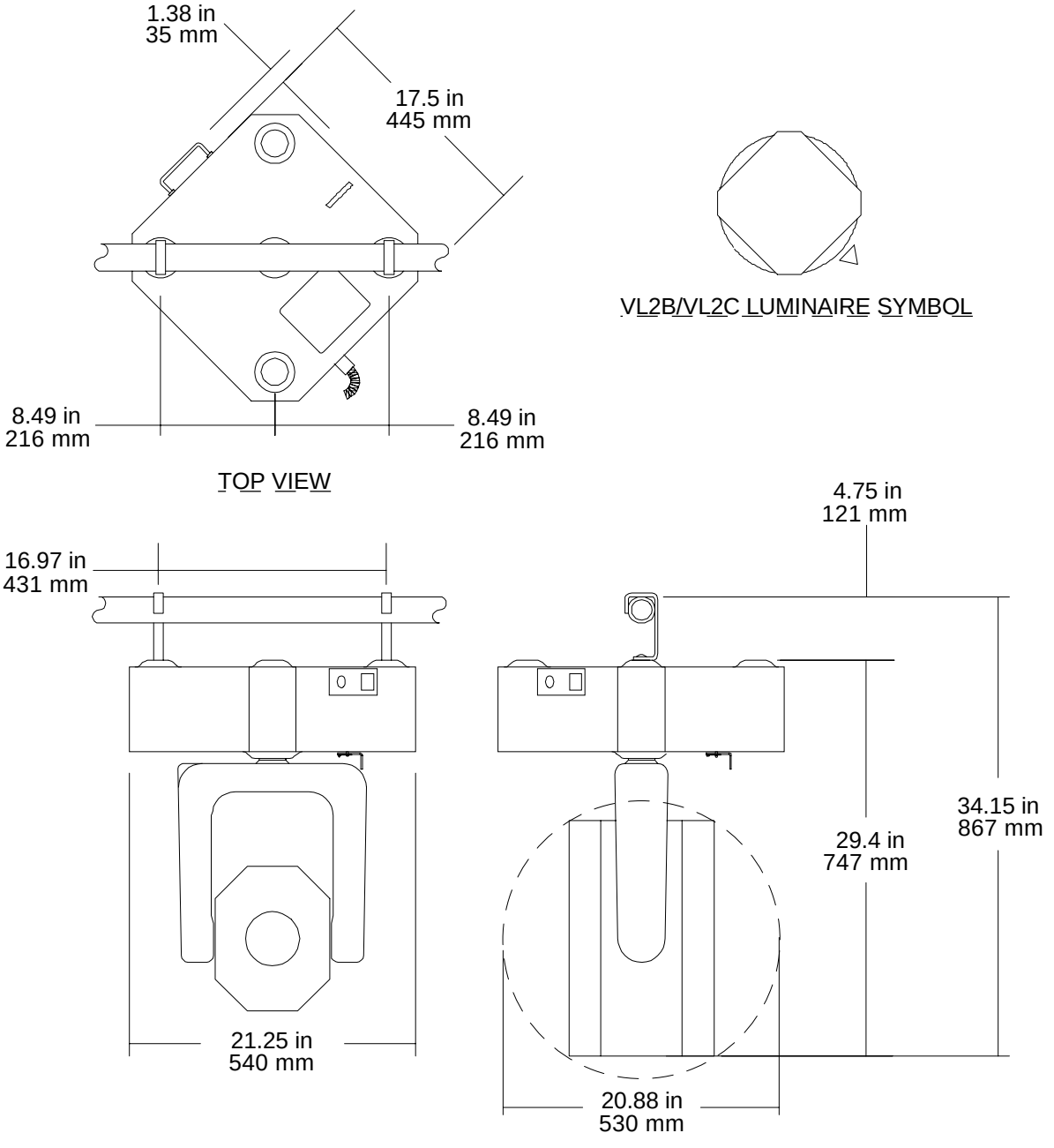


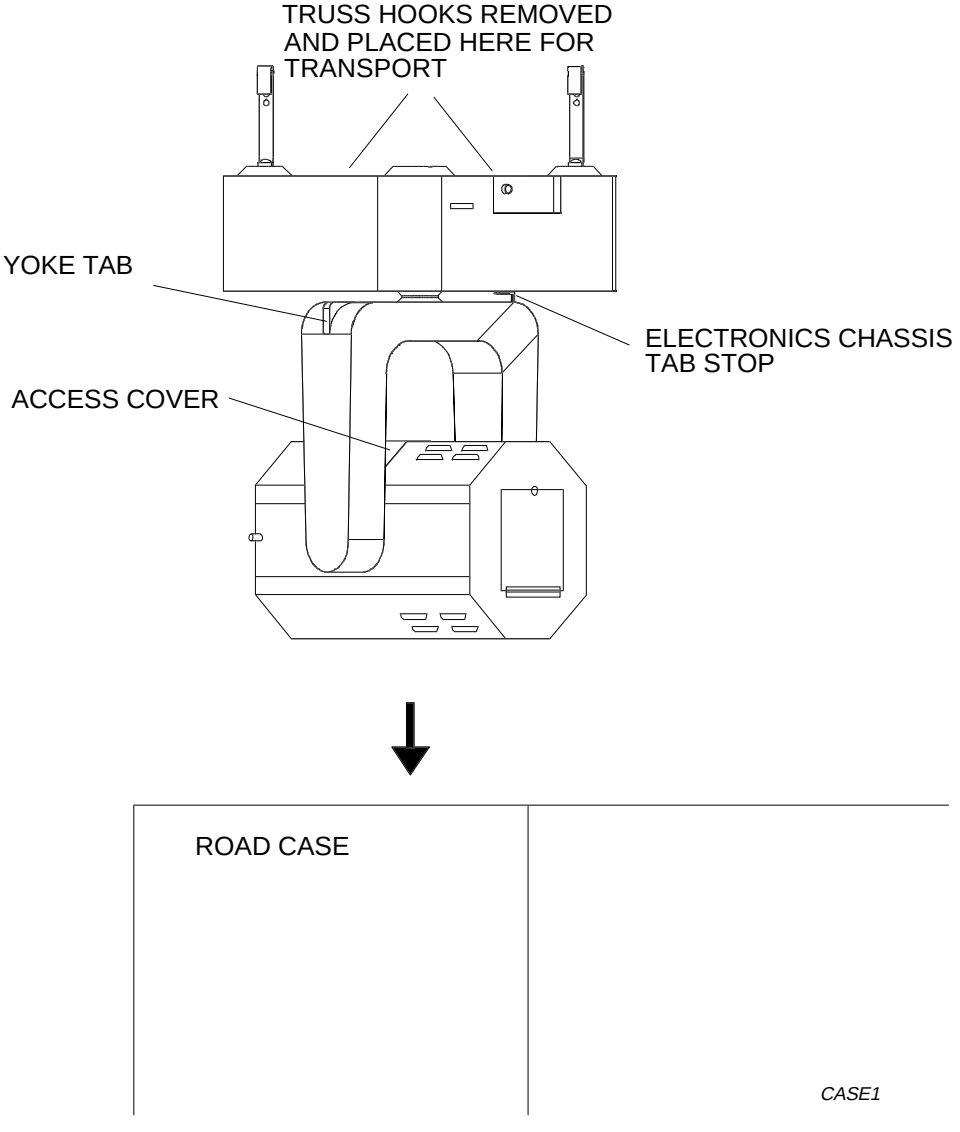
Figure 2-1. *VL2B/VL2C* Luminaire Hanging Clearances

2.1.2 Luminaire Packing

In order to ensure that luminaires are not damaged during shipment, it is important to properly pack in the case.

When packing **VL2B/VL2C** luminaires into road cases, it is important to load the luminaire with the yoke tab and electronics chassis tab stop on opposite sides of each other. The luminaire head must be horizontal with the gobo filter assembly access door facing the electronics chassis. This orientation prevents the tab and tab stop from interfering with each other and prevents the color filter assembly from being damaged during shipment. Also, the luminaire handles should all face the same direction toward the long side of the road case. This allows easier unloading.

Truss hooks are disconnected from the electronics chassis and placed on the bottom of the chassis (now facing up in the case). The case cover holds the hooks securely in place during transport.



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2.2 Checkout

Use this procedure to verify proper equipment operation.

2.2.1 Power-Up

Step 1. Connect luminaire to a **VARI*LITE Series 200** console via an ACS Rack and repeater unit or via a cheater repeater.

Step 2. Supply system power to luminaire and turn on console.

Step 3. Watch for luminaire calibration. If luminaire does not calibrate within 2 minutes, check lamp cable connection and address.

Step 4. Verify that luminaire responds to control console commands. (Instructions for exercising luminaire functions should be referenced from the operator's manual that accompanies that particular controller or the Series 200 System Installation & Checkout Manual .) If luminaire does not respond properly, refer to Test and Fault Isolation sections in Chapter 3.

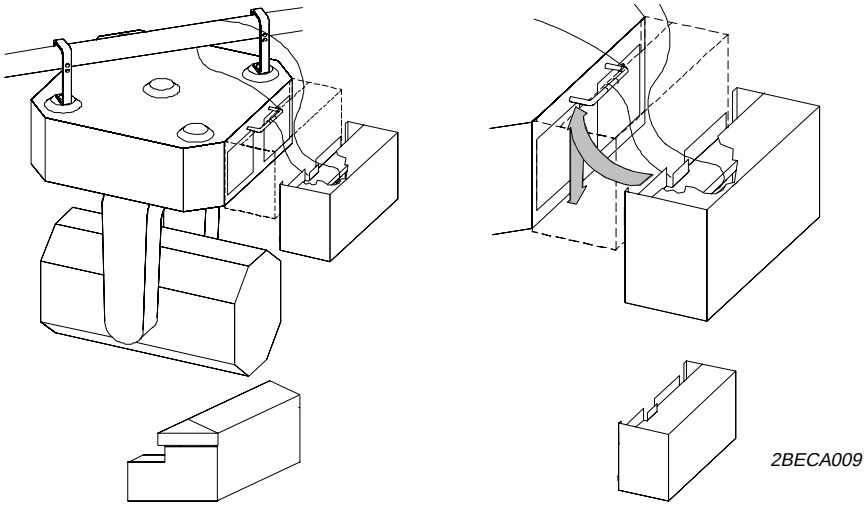
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2.3 Installing *VL2B/VL2C* Accessories

2.3.1 Installing Sound Baffles

Some hang locations require a reduced noise environment. Fan noise in luminaires can be greatly reduced by using the **VL2B/VL2C** luminaire sound baffle (with or without sound blanket).

No additional hardware is used to secure the sound baffles to the luminaires when the luminaires are hung from trusses. The sound baffles are secured to the luminaire with safety cables. For ground installations, safety cables are not required. For all uses of the sound baffle, the baffle fits over the fan opening and air filter. It **is not** necessary to remove the air filter from **VL2B** and **VL2C** luminaires before installation.



MODIFIED SOUND BAFFLE OLDER STYLE BAFFLE

To install sound baffle:

Step 1. Route safety cable around center flange of sound baffle.

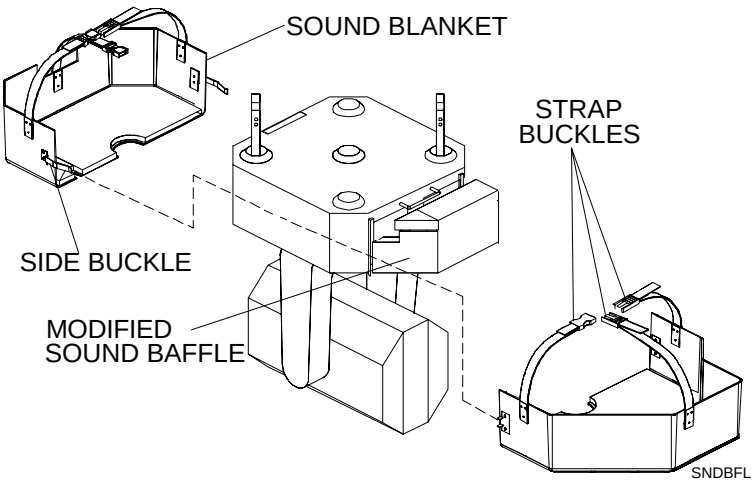
Step 2. Align sound baffle with air intakes.

Step 3. Push up center flanges of baffle into space between fan intakes and air filters.

Step 4. Push down bottom flanges of baffle into space between fan intakes and air filters.

Step 5. Ensure baffle fits snugly.

2.3.1.1 *VL2B* and *VL2C* Luminaire Sound Blanket Installation



Step 1. At sound blanket, unlatch buckles from straps and buckles from side of baffle shell.

Step 2. At luminaire, place sound blanket shells on luminaire and snap strap buckles.

Step 3. At each side of sound blanket, secure side buckles.

2.4 Lamp Optical Alignment

The proper focus of the luminaire occurs when the source of illumination (lamp) is on the optical axis of the reflector. The optical alignment can be achieved by moving the hotspot to the center of the beam using the horizontal and vertical adjustment knobs on the lamp access plate of the luminaire.

WARNING: Luminaire gets extremely hot. An insulated glove or #2 Philips screwdriver is recommended when making knob adjustments. If screwdriver is to be used, alignment should be performed with luminaire at ground level. Adjustments requiring tools should not be performed on equipment suspended in the air.

To optically align lamp:

Step 1. Using ACS Rack and repeater or cheater repeater, connect luminaire to control console.

Step 2. Apply power to luminaire and console.

Step 3. Start lamp and allow few minutes for lamp to warm up.

Step 4. Choose flat surface such as floor or wall onto which to direct light beam. This makes light beam hotspot visible.

Step 5. Focus beam on flat surface with no color and no diffusion.

Step 6. At console, turn BEAM knob fully clockwise and EDGE knob fully counterclockwise.

Step 7. At luminaire rear cover, open rear door.

Step 8. At beam adjustment knob (**Figure 2-2**), turn knob until hotspot can be clearly identified.

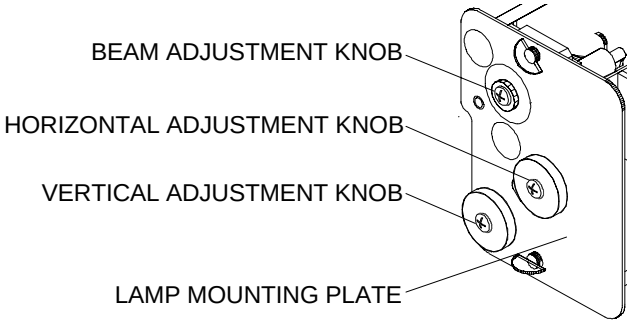


Figure 2-2. Lamp Optical Alignment

Step 9. Identify horizontal and vertical adjustment knobs on lamp mounting plate. Use these knobs to move hotspot to center of beam.

CAUTION:

- To avoid breaking lamp, if there is difficulty in turning horizontal and vertical adjustment knobs, and lamp feels like it is striking ellipsoid reflector, turn knob in other direction.
- Do not turn beam adjustment knob clockwise too far as it may cause a dark spot to appear in center of light beam.

Step 10. After centering hotspot, turn beam adjustment knob clockwise until hotspot disappears. This will cause a uniform light field.

Chapter 3. Maintenance Procedures

This chapter contains the following sections:

3.1 Test Procedures

3.2 Luminaire Fault Isolation

3.3 Luminaire Maintenance Procedures

Periodic Maintenance

Refer to **Series 200** System Equipment Preparation and Inspection Manual (02.3004.0042) for periodic maintenance procedures for new and used equipment.

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3.1 Test Procedures

Tests can be performed on the **VL2B/VL2C** luminaire by means of diagnostic EPROMs placed in the luminaire itself or, in the case of the **VL2C** luminaire by downloading test software from the console. Both methods are designed to exercise the luminaire in all functional areas to aid in troubleshooting. It should be noted that downloaded tests provide for varying specific parameters (such as speed) for some tests while the EPROMs have fixed parameters.

3.1.1 EPROM Test

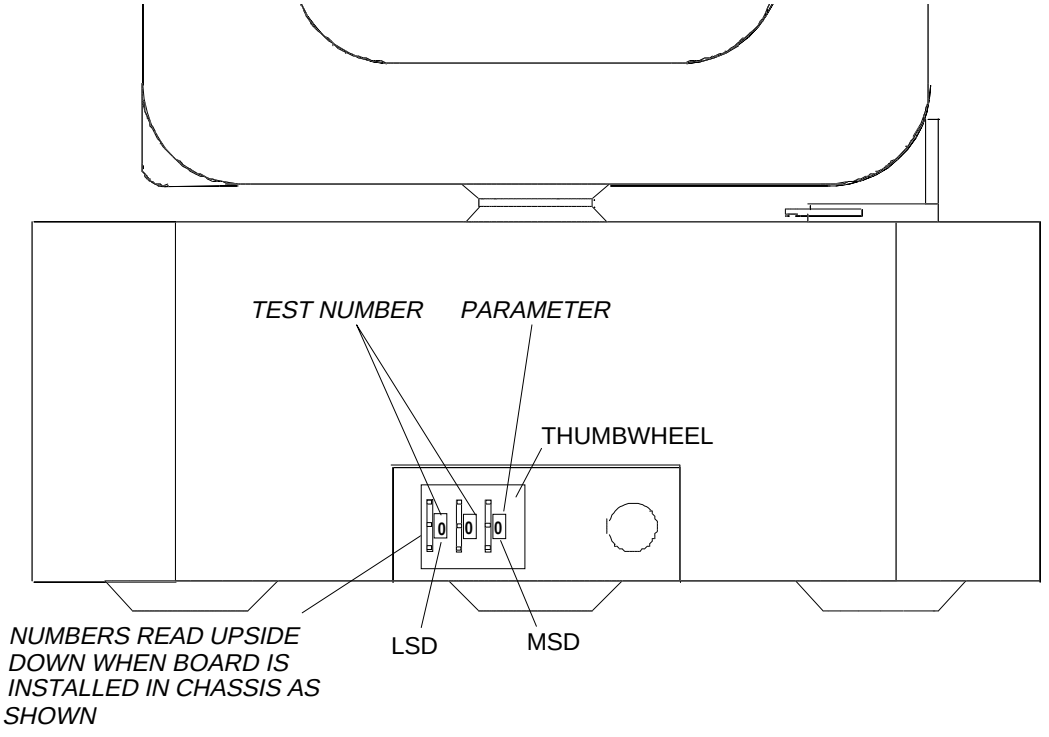
3.1.1.1 Description

The **VL2B/VL2C** luminaire has the ability to use diagnostic EPROM's to aid in troubleshooting. A set of diagnostic EPROMs (labeled "TEST") is contained in the system test rack or spares rack. After installation of the EPROMs on the lamp control PCB (LCB) (refer to EPROM Test Setup paragraph), the luminaire can perform tests to help determine a faulty assembly. The tests are activated by setting the thumbwheel address to a corresponding test position.

3.1.1.2 Thumbwheel

The two least significant digits (ones and tens digits) of the thumbwheel are defined as the test number. This number is used to select the required test. The most significant digit (hundreds digit) is defined as the parameter for the selected test. Not all tests have selectable parameters, but on those that do, it will alter an aspect of the test. For example, speed of oscillation during a movement test.

Note: Thumbwheel switches are oriented so readout appears normal when the luminaire is suspended from a truss with head downward. If the luminaire is setting on a flat surface instead of hanging, thumbwheel numbers will appear upside down and the least significant digit will be on the left.


TEST NUMBER
PARAMETER
THUMBWHEEL
0
0
0
NUMBERS READ UPSIDE DOWN WHEN BOARD IS INSTALLED IN CHASSIS AS SHOWN
LSD
MSD

3.1.1.3 EPROM Test Setup

Parts:

1 EA PROM,(PRGMD:27C256-2) **VL2B** HI TEST (87.7138.0001)

1 EA PROM,(PRGMD:27C256-2) **VL2B** LOW TEST (87.7138.0002)

1 EA PROM, (PRGMD:27C256-2) **VL2C** HI TEST (87.7149.0001)

1 EA PROM, (PRGMD:27C256-2) **VL2C** LO TEST (87.7149.0002)

Tools:

IC extractor
Cheater cable

To install test EPROMs and test *VL2B/VL2C* luminaire:

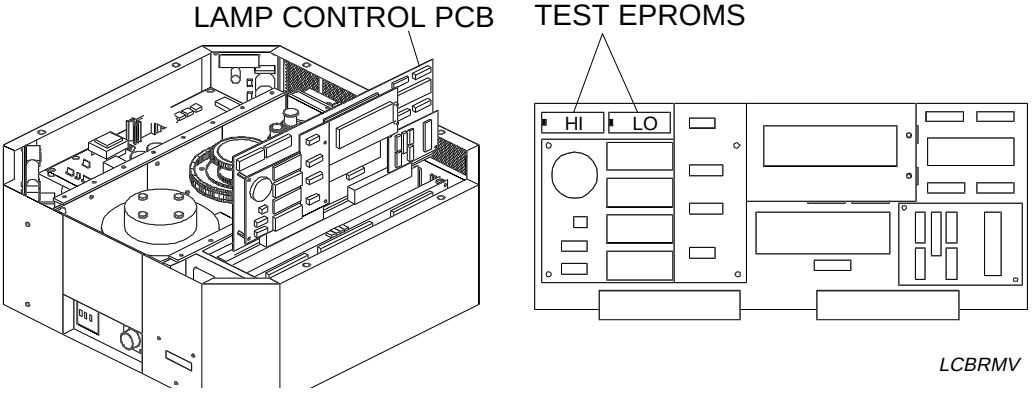
Step 1. Remove luminaire from system installation.

Step 2. Remove lamp control PCB.

a. Remove six 10-32x3/8”PPB screws that secure chassis cover to electronics chassis assembly.

b. Open chassis cover.

c. At card retainer, carefully pull out lamp control PCB.



Step 3. Install test EPROMs.

a. At lamp control PCB, using IC extractor tool, remove system EPROMs.

b. Install HI and LO -test EPROMs.

Step 4. Re-install lamp control PCB. Close and secure chassis cover.

Step 5. Set thumbwheel address to 000.

Note: Power is immediately sent to luminaire when cheater cable is connected. Do not connect cheater cable to luminaire until ready to perform tests.

Step 6. Install cheater cable (local 3-pin power connector on one end and a 9-pin CPC connector on the other) to supply power to luminaire. Connect 9-pin CPC of cheater cable to **Series 200** connector at luminaire chassis. Luminaire cooling fans will run and LCB LED will blink. The luminaire will not calibrate.

Step 7. Set thumbwheel to desired test. Refer to Test Results Charts section.

3.1.1.4 EPROM Test Code Description

The following sections describe the LED indicators and the expected results of each individual test code.

Test Codes

With test EPROM's installed, the following tests may executed by selecting the proper thumbwheel position:

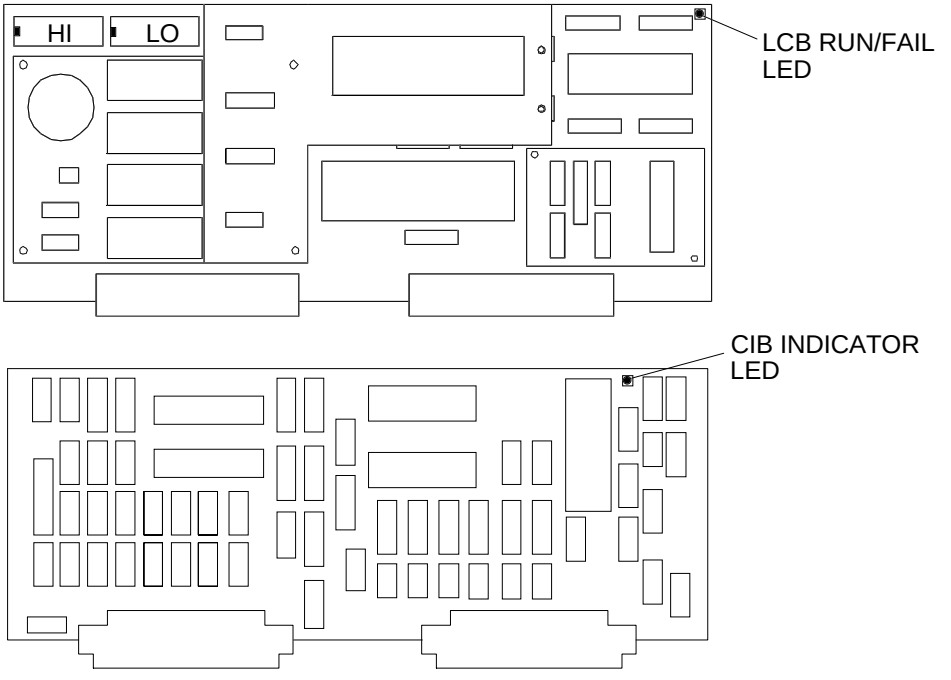
Thumbwheel Number	Test Executed
000	CIB
001	Pan servo
002	Tilt servo
003	Beam iris
004	Lens
005	Brightness iris
006	Color wheel 1 test w/sensor
007	Color wheel 2 test w/sensor
008	Gobo wheel test w/sensor
009	Combined test of 001 thru 008
016	Color wheel 1 continuous cycle
017	Color wheel 2 continuous cycle
018	Gobo wheel continuous cycle
019	Continuous cycle of all 3 wheels
020	Lamp start/on
021	Lamp standby
022	Lamp off

Any other switch settings have no effect.

LED Indicators

When the test is started, the run/fail LED on the lamp control board (LCB) will flash indicating the CPU is executing the test routine. If the LED stops flashing, an error condition has occurred to the test in progress. The LED on the control interface board (CIB) is used in certain tests to indicate status of events with the test.

Note: The CIB test (000) should be performed first. The CIB drives the servo and stepper systems.



Test 000 - Control Interface Board

The CIB should be tested first since it drives the servo and stepper systems exercised in the following tests. When test 000 is executed, the CIB indicator LED is lit if the test passes, and remains lit until another test is performed.

Test 001 - Pan Servo

When test 001 is executed, the pan motor drives the yoke against the pan stop in each direction. The yoke continues to pan back-and-forth until the thumbwheel setting is changed. Failure is indicated if the yoke pans with jerky movements, too slowly, not at all, or remains against the stop.

NOTE: The code used in the test EPROM's for tests 1, 2, and 9 is similar to the code used in the operating system. The luminaire will pan and tilt similar to the calibration process, and then go into test properly. This applies to the tilt test as well.

Test 002 - Tilt Servo

When test 002 is executed, the tilt motor drives the head against the tilt stop in each direction. The head continues to tilt back-and-forth until the thumbwheel setting is changed. Failure is indicated if the head tilts with jerky movements, too slowly, not at all, or remains against the stop.

Test 003 - Beam Iris

When test 003 is executed, the beam iris is cycled open and closed. Failure is indicated if the beam iris will not move.

Test 004 - Lens Assembly

When test 004 is executed, the lens is cycled fully in and out. Failure is indicated if the lens will not move or travels improperly.

Test 005 - Brightness Iris

When test 005 is executed, the brightness iris is driven closed until the sensor is engaged. The iris is then cycled almost fully open and then closed. Failure is indicated if the iris will not move or stops prematurely.

Test 006 - Color Wheel 1 with Sensor

When test 006 is executed, color wheel 1 is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the thumbwheel setting is changed.

Test 007 - Color Wheel 2 with Sensor

When test 007 is executed. color wheel 2 is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the thumbwheel setting is changed.

Test 008 - Gobo Wheel with Sensor

When test 008 is executed, the gobo wheel is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the thumbwheel setting is changed.

Test 009 - Combined Tests (Tests 001 - 008)

When test 009 is executed, all eight servo/stepper systems (tests 001 thru 008) are continuously exercised.

Test 016 - Color Wheel 1 (Continuous Cycle)

When test 016 is executed, color wheel 1 steps until it encounters the sensor and then rotates continuously.

NOTE: This test will not function if the sensor is not found.

The position of color and gobo wheels in relation to the bulkhead is critical in **VL2B/VL2C** luminaires. Alignment of the wheel to the motor shaft MUST be correct. This is best done using a motor/sensor test unit at a service center. If you have a bulkhead in which a wheel has slipped or has come loose, send it back to a service center for evaluation.

This also applies to the sensor bracket. Using the test EPROM's to adjust the sensor position on the bracket is recommended, but the adjustment of the bracket on the bulkhead is best left to technicians at a service center.

Be advised that some of the older AIRPAX motors may not start at the test codes higher motor speed. This does not necessarily mean that the motor is damaged. Try jump-starting the wheel by flipping it in the right direction. The wheel should start up and run fine. If the wheel does not start, send the bulkhead back to a service center for evaluation. Be careful not to damage the wheel or hurt your finger.

Test 017 - Color Wheel 2 (Continuous Cycle)

When test 017 is executed, color wheel 2 steps until it encounters the sensor and then rotates continuously. Failure is indicated if the wheel does not move or stops at the sensor.

Test 018 - Gobo Wheel (Continuous Cycle)

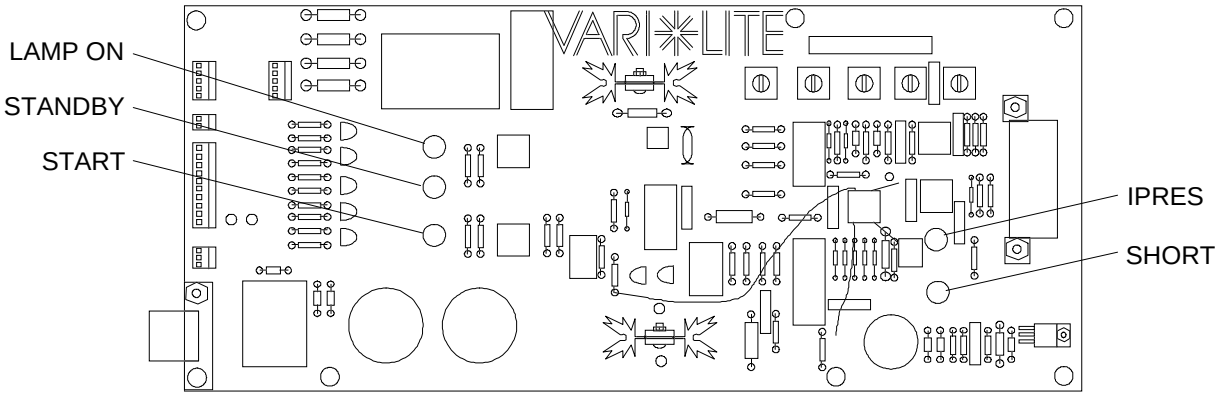
When test 018 is executed, the gobo wheel steps until it encounters the sensor and then rotates continuously. Failure is indicated if the wheel does not move or stops at the sensor.

Test 019 - Continuous Cycle (Three Wheels)

When test 019 is executed, all three wheels rotate continuously.

Test 020 - Lamp Start

When test 020 is executed, the lamp will ignite. If the lamp is off, the ignitor board will pulse until the lamp is lit or the switch setting is changed. If the lamp is in standby mode (test 021), it will be returned to full intensity. When the lamp is lit, arc power supply indicators LAMP ON, START, and IPRES should be lit; SHORT and STANDBY should be out. The hour meter should be running and the fan running on high speed.



APS Indicator LED's

Notes:

- Once test 020 is executed, the lamp self-start mode is activated. Every time a new test is entered, the lamp will self-start. Every time a test is exited, the lamp will douse. This can be very damaging to lamps. It is best to leave a lamp lit 20 minutes after starting. At least, let it run for 5 minutes.
- To run a test with the lamp lit, enter test 020, let it run for 5 minutes, and then go to the desired test. The lamp will douse on exiting test 020 and re-start after entering the next test. To douse the lamp for further tests, enter test 022 and the lamp self-starting mode will be exited.

Test 021 - Lamp Standby

If the lamp has been started, this setting will put the lamp in standby mode, reducing lamp current and brightness. Arc power supply indicators LAMP ON, STANDBY, START, and IPRES should be lit; SHORT should be out.

Test 022 - Lamp Off

This setting turns the lamp off and exits the self-starting mode. Arc power supply indicator SHORT should be lit and all others should be out; unless the last test executed was the Lamp Standby test (021), in which case the standby indicator will remain lit. The lamp will also be doused if any setting outside the range of 020 through 029 is selected. The lamp will re-start, however, even if no test is to be run, that is, test 030 will start the bulb and do nothing if you are in the self-starting mode.

Test 023-029

These settings are not really tests, but if the lamp is lit and one of these settings is entered, the lamp will not douse but will go into standby. However, re-entering test 020 will cause the lamp to douse and re-start, or return to 100 percent as in test 021.

3.1.2 Download Test

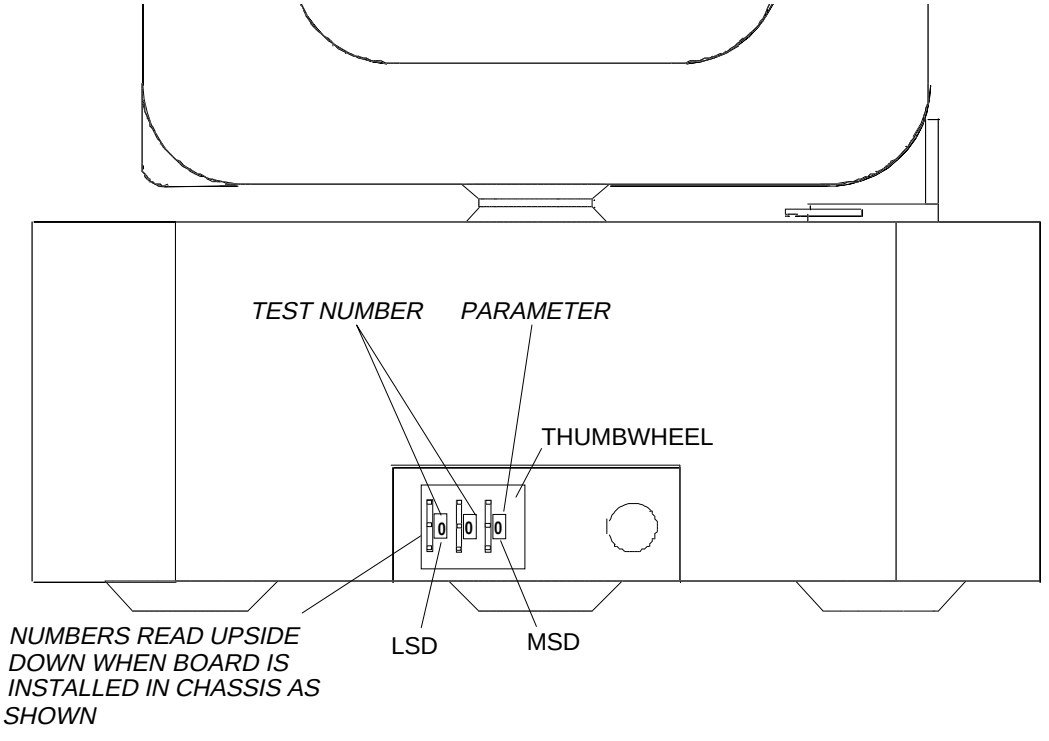
3.1.2.1 Description

The **VL2C** luminaire has the ability to use downloaded test software to aid in troubleshooting. A software test program exists in **Artisan® Plus**, **mini-Artisan®2**, and **mini-Artisan® plus** control consoles. After the software has been downloaded from the control console to the luminaire, the luminaire can perform tests to help determine a faulty assembly. Most luminaire functions have the ability to generate error codes when tested and display errors at console control board window. The tests may be activated by setting the thumbwheel address to a corresponding test position or controlled from the console.

3.1.2.2 Test Number

The two least significant digits of the test are defined as the test number. The most significant digit is defined as the parameter for the selected test. Not all tests have selectable parameters, but on those that do, it will alter an aspect of the test. For example, speed of oscillation during a movement test.

Note: Thumbwheel switches are oriented so readout appears normal when the luminaire is suspended from a truss with head downward. If the luminaire is setting on a flat surface instead of hanging, thumbwheel numbers will appear upside down and the least significant digit will be on the left.



3.1.2.3 Downloadable Test Setup

To prepare luminaires for downloadable test:

Step 1. Connect luminaire to console utilizing all appropriate equipment and apply power. Refer to **Series 200**® System Installation and Checkout Manual (02.9622.0010).

Step 2. At console board control window, scroll to Board Utilities and select [DIAGS] Option .

Step 3. Under Diagnostic Services there are four options. Select [DNLD TEST].

Note: Luminaire Test window has two pages. Pressing the Page button scrolls back and forth between the two pages.

Step 4. At the console, select channels for all luminaires to be tested.

Step 5. Press and hold the [ENABLE] button and press [RESET TST]. To test multiple luminaires simultaneously, press [RESET TST] twice.

Selected luminaires will calibrate, then head and yoke will go to limit stop and remain in that position.

3.1.2.4 Verifying Software Downloaded

To verify test has been downloaded to appropriate luminaires:

Step 1. At console, press [TEST CHANNELS].

Step 2. At cue key pad (for **mini-Artisan 2** and **mini-Artisan Plus** consoles) or console channel select panel (for **Artisan** control console), verify channels selected for test.

3.1.2.5 Perform Test

Once test software has been downloaded, test may be run from console or from individual luminaire by adjusting luminaire thumbwheel. To return luminaire to console control, thumbwheel setting must be reset to original address. All selected luminaires may be tested simultaneously, or individual luminaires may be selected at the console for individual testing. With software loaded in luminaire, luminaire may be disconnected from console and repowered via cheater cable for isolated remote test and/or troubleshooting.

To perform self test:

Step 1. At console, change page to Luminaire Test Status.

Step 2. At console, type test number in cue keypad window (or console channel select panel) and observe test. Refer to Test Code Description paragraph in this procedure for specific test numbers.

Note: Leading zeros for tests are assumed by console software and need not be entered. Example: Test 1 is assumed to be 001.

3.1.2.6 Reading Error Codes

While luminaires may be tested simultaneously, error codes must be read sequentially, one luminaire at a time.

To locate and read error codes:

Step 1. At console, go to Luminaire Test window (not to be confused with Luminaire Test Stat window).

Step 2. Press [ERR CHANS]. Channels with test errors will be displayed on cue key pad (for **mini-Artisan 2** and **mini-Artisan Plus** consoles) or console channel select panel (for **Artisan** control console).

Step 3. At console, switch to Luminaire Test Status window.

Step 4. At console cue keypad or the channel select panel, enter channel for luminaire to be analyzed.

Step 5. Press and release [CHANNEL] button. Error code for selected channel will display in console board control window.

Step 6. Press and release [NEXT ERR] button to scroll to next error for same luminaire.

Step 7. To observe errors for additional channels, deselect current channel and repeat steps 4 thru 6.

Note: Most Significant Digit (MSD) of error code corresponds to Least Significant Digit (LSD) of test number. For example, any error code beginning with 6 would indicate an error associated with color wheel #1 (Test X06 is the test for color wheel #1, as indicated in the Test Code Description paragraph).

3.1.2.7 Conclude Test

After tests have been run, it is necessary to unload test operating system software and reload normal operating system software to luminaire(s).

Note: Actual cue memory remains in the luminaire LCB PCB at all times and is unaffected by test software download.

To unload test software and reload normal operating software:

Step 1. At console, select all luminaires with test software.

Step 2. At console Luminaire Test window, press and hold [ENABLE] button. With Enable button held down, press [RESET NRM] button twice. Test software will be replaced with normal operating system and luminaire(s) will recalibrate.

3.1.2.8 Test Code Description

The following sections describe the expected results of each individual test code.

Test Codes

With test software loaded, the following tests may be executed by selecting the proper thumbwheel position or selecting desired luminaire(s) from console:

Thumbwheel Number	Test Executed
X01	Pan servo
X02	Tilt servo
X03	Beam iris
X04	Lens (focus/edge)
X05	Brightness iris (douser)
X06	Color wheel 1 test w/sensor
X07	Color wheel 2 test w/sensor
X08	Gobo wheel test w/sensor
X09	n/a
X10	n/a
X11	n/a
X12	unsynchronized color and gobo
X13	synchronized color and gobo
X14	n/a
X15	lamp
X16	n/a
X17	n/a
X18	n/a
X19	n/a
X20	APS power supply
X21	sensor

Test X01 - Pan Servo

When test X01 is executed, the pan motor drives the yoke against the pan stop in each direction. The yoke continues to pan back-and-forth until the test setting is changed. Failure is indicated if the yoke pans with jerky movements, too slowly, not at all, or remains against the stop.

Parameter settings for test X01 are as follows:

Parameter Test setting	Test Results
001	4 second pan from stop to stop
101	same as above
201	same as above
301	6 second pan from stop to stop
401	8 second pan from stop to stop
501	10 second pan from stop to stop
601	16 second pan from stop to stop
701	45 second pan from stop to stop
801	pan to stop
901	pan to stop

Test X02 - Tilt Servo

When test X02 is executed, the tilt motor drives the head against the tilt stop in each direction. The head continues to tilt back- and-forth until the test setting is changed. Failure is indicated if the head tilts with jerky movements, too slowly, not at all, or remains against the stop.

Parameter settings for test X02 are as follows:

Parameter Test setting	Test Results
002	4 second tilt from stop to stop
102	same as above
202	same as above
302	6 second tilt from stop to stop
402	8 second tilt from stop to stop
502	10 second tilt from stop to stop
602	16 second tilt from stop to stop
702	45 second tilt from stop to stop
802	tilt to stop
902	tilt to stop

Test X03 - Beam Iris

When test X03 is executed, the beam iris is cycled open and closed. Failure is indicated if the beam iris will not move or travels improperly.

Parameter settings for test X03 are as follows:

Parameter Test setting	Test Results
003	2 seconds from full open to full close
103	same as above
203	4 seconds from full open to full close
303	6 seconds from full open to full close
403	10 seconds from full open to full close
503	20 seconds from full open to full close
603	1 minute from full open to full close
703	5 minutes from full open to full close
803	open
903	closed

Test X04 - Lens Assembly

When test X04 is executed, the lens is cycled fully in and out. Failure is indicated if the lens will not move or travels improperly.

Parameter settings for test X04 are as follows:

Parameter Test setting	Test Results
004	2 seconds from full out to full in
104	same as above
204	4 seconds from full out to full in
304	6 seconds from full out to full in
404	10 seconds from full out to full in
504	20 seconds from full out to full in
604	1 minute from full out to full in
704	5 minutes from full out to full in
804	open
904	closed

Test X05 - Brightness Iris

When test X05 is executed, the brightness iris is driven closed until the sensor is engaged. The iris is then cycled almost fully open and then closed. Failure is indicated if the iris will not move or stops prematurely.

Parameter settings for test X05 are as follows:

Parameter Test setting	Test Results
005	2 seconds from full open to full close
105	same as above
205	same as above
305	4 seconds from full open to full close
405	10 seconds from full open to full close
505	20 seconds from full open to full close
605	1 min. 30 sec. from full open to full close
705	5 minutes from full open to full close
805	open
905	closed

Test X06 - Color Wheel 1 with Sensor

When test X06 is executed, color wheel 1 is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the test setting is changed.

Parameter settings for test X06 are as follows:

Parameter Test setting	Test Results
006	5 sec. rotation of wheel forward and reverse. Stop at open white.
106	2 sec. rotation of wheel forward and reverse. Stop at open white.
206	cycles between red and light blue.
306	continuous step through color wheel
406	reverse rotation 5X; forward rotation 5X
506	slow reverse steps through color wheel filter by filter
606	15 sec. 2X reverse, 15sec. 2X forward
706	slow reverse rotation
806	stop at open white
906	high speed wheel spin

Test X07 - Color Wheel 2 with Sensor

When test X07 is executed. color wheel 2 is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the test setting is changed.

Parameter settings for test X07 are as follows:

Parameter Test setting	Test Results
007	5 sec. rotation of wheel forward and reverse. Stop at open white.
107	2 sec. rotation of wheel forward and reverse. Stop at open white.
207	cycles between red and light blue.
307	continuous step through color wheel
407	reverse rotation 5X; forward rotation 5X
507	slow reverse steps through color wheel filter by filter
607	15 sec. 2X reverse, 15sec. 2X forward
707	slow reverse rotation
807	stop at open white
907	high speed wheel spin

Test x08 - Gobo Wheel with Sensor

When test X08 is executed, the gobo wheel is cycled until it encounters the sensor. The wheel stops, rotates away from the sensor, and back again. If the sensor is not detected, the wheel continues to cycle until the fault is corrected or the test setting is changed.

Parameter settings for test X08 are as follows:

Parameter Test setting	Test Results
008	5 sec. spin reverse, 5 sec. spin forward
108	1 full spin reverse, 1 full spin forward
208	open white to half-way around wheel and back
308	slow rotation with stop at each gobo
408	reverse rotation 5X; forward 5X
508	very slow reverse rotation
608	15 sec. 2X reverse, 15sec. 2X forward
708	step by step reverse rotation
808	stop at open white, no gobo
908	fast reverse rotation spin

Test X12 - Combined Tests, Synchronized

When test X12 is executed, all previous mechanical tests run simultaneously and in phase with one another. Parameter setting controls overall speed.

Parameter settings for test X12 are as follows:

Parameter Test setting	Test Results
012	simultaneous synchronized testing of 001, 002, 003, 004, 006, 007 and 008
112	simultaneous synchronized testing of 101, 102, 103, 104, 106, 107 and 108
212	simultaneous synchronized testing of 201, 202, 203, 204, 206, 207 and 208
312	simultaneous synchronized testing of 301, 302, 303, 304, 306, 307 and 308
412	simultaneous synchronized testing of 401, 402, 403, 404, 406, 407 and 408
512	simultaneous synchronized testing of 501, 502, 503, 504, 506, 507 and 508
612 thru 912	n/a

Test X13 - Combined Tests, Unsynchronized

When test X12 is executed, all previous mechanical tests run simultaneously and independent of one another (unsynchronized). Parameter setting controls overall speed.

Parameter settings for test X13 are as follows:

Parameter Test setting	Test Results
013	simultaneous unsynchronized testing of 001, 002, 003, 004, 006, 007 and 008
113	simultaneous unsynchronized testing of 101, 102, 103, 104, 106, 107 and 108
213	simultaneous unsynchronized testing of 201, 202, 203, 204, 206, 207 and 208
313	simultaneous unsynchronized testing of 301, 302, 303, 304, 306, 307 and 308
413	simultaneous unsynchronized testing of 401, 402, 403, 404, 406, 407 and 408
513	simultaneous unsynchronized testing of 501, 502, 503, 504, 506, 507 and 508
613 thru 913	n/a

Test X15 - Lamp Test

When test X15 is executed, power is applied to or removed from the lamp.

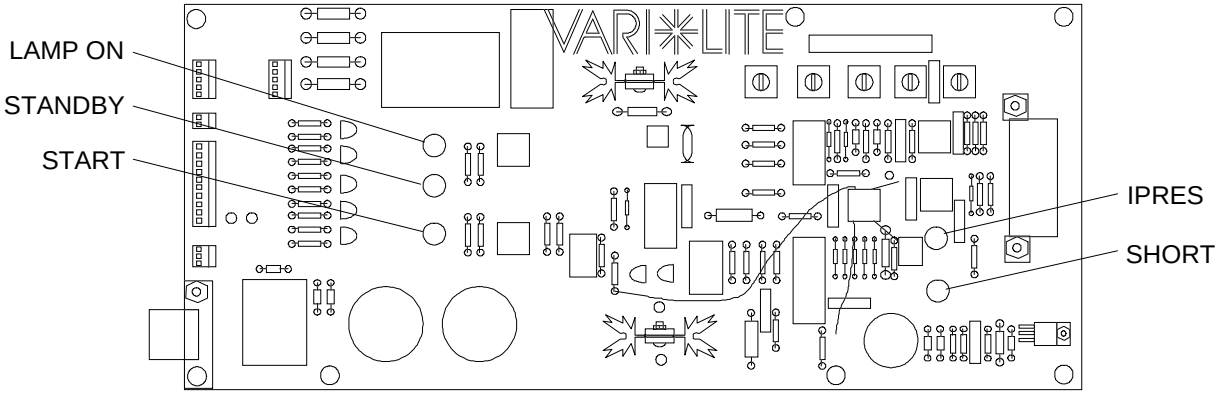
Parameter settings for test X15 are as follows:

Parameter Test setting	Test Results
015	Lamp out.
115	Puts luminaire APS in standby (standby LED lit on APS)
815	Lamp on. Start signal to APS. Lamp on and Start LED lit on APS.
915	This test puts lamp out and sends signal to APS to light Lamp On LED.

Test 020 - APS Power Supply Test

This test is intended for use by APS bench test technicians. This test overrides conditions that would normally shut down the APS, thus allowing readings and circuit adjustments.

When test 020 is executed, the lamp will ignite. If the lamp is off, the ignitor board will pulse until the lamp is lit or the switch setting is changed. If the lamp is in standby mode (test 021), it will be returned to full intensity. When the lamp is lit, arc power supply indicators LAMP ON, START, and IPRES should be lit; SHORT and STANDBY should be out. The hour meter should be running and the fan running on high speed.



APS Indicator LED's

Notes:

- Once test 020 is executed, the lamp self-start mode is activated. Every time a new test is entered, the lamp will self-start. Every time a test is exited, the lamp will douse. This can be very damaging to lamps. It is best to leave a lamp lit 20 minutes after starting. At least, let it run for 5 minutes.
- To run a test with the lamp lit, enter test 020, let it run for 5 minutes, and then go to the desired test. The lamp will douse on exiting test 020 and re-start after entering the next test. To douse the lamp for further tests, enter test 022 and the lamp self-starting mode will be exited.

Test X21 - Sensor Test

The sensor test reads the state of a selected sensor. The parameter setting determines which sensor is selected for test. A flashing LED on the CIB PCB indicates an open sensor. A lit LED indicates a closed (detected) sensor. Select test and manually move function across sensor range (engage microswitch for intensity or rotate black stripe on wheel in front of sensor).

Parameter settings for test X21 are as follows:

Parameter Test setting	Test Results
521	Intensity sensor
621	Color wheel 1
721	Color wheel 2
821	Gobo wheel

Test X22 - Pan Encoder Test

This test reads shaft encoder position and displays position in hexidecimal on the control console. This test must be run from a control console and cannot be run from an independent luminaire powered by a cheater cable.

Pan position is read one hexidecimal position at a time. Test parameter setting determines which digit is displayed on console. Enter test number and manually adjust Pan rotation knob. Smooth, sequential increments indicate proper data from encoder.

Parameter settings for test X22 are as follows:

Parameter Test setting	Test Results
922	Most Significant Digit of pan position from encoder. MSD reads 1,2, or 3 only.
822	Middle digit of pan position. Readout is from 0 through F. (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F)
722	Least Significant Digit of pan position from encoder. LSD readout is 0 to F. (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F)

Test X23 - Tilt Encoder Test

This test reads shaft encoder position and displays position in hexidecimal on the control console. This test must be run from a control console and cannot be run from an independent luminaire powered by a cheater cable.

Tilt position is read one hexidecimal position at a time. Test parameter setting determines which digit is displayed on console. Enter test number and manually adjust Tilt rotation knob. Smooth, sequential increments indicate proper data from encoder.

Parameter settings for test X23 are as follows:

Parameter Test setting	Test Results
923	Most Significant Digit of pan position from encoder. MSD reads 1,2, or 3 only.
823	Middle digit of pan position. Readout is from 0 through F. (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F)
723	Least Significant Digit of pan position from encoder. LSD readout is 0 to F. (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F)

Test 24 - Form and Function Test

This test provides a hexidecimal readout of the binary form and function switch settings located on the luminaire motherboard. There is no parameter setting for this test. Simply enter the two digit test number 24.

VL2B luminaires should display “0A” on the control console corresponding to the digital switch setting 00001010 as read from the motherboard, not the switch face.

VL2B+ luminaires should display “8A” on the control console corresponding to the digital switch setting 10001010 as read from the motherboard, not the switch face.

VL2C luminaires should display “0B” on the control console, corresponding to the digital switch setting 00001011 as read from the motherboard, not the switch face.

Test 30 - Test Stack

Test 30 is designed to be a user defined test. When test 30 is selected, the user can then enter test numbers X01 through X08 and stack them one on the other, creating combined tests similar to test X13. These user defined tests can be stored in memory as test numbers 31 through 39 and recalled at anytime as long as test operating system remains in luminaire.

Test 40 - Error Code History

Entering test setting 40 for a selected luminaire provides a history of error codes for that luminaire compiled since testing began or prior error code messages were cleared, whichever is more recent. Error codes are displayed one at a time in the console board control window. Pressing [NEXT ERR] advances display to next error code.

Test 41 - Error Code Clear

Entering test setting 41 for a selected luminaire clears all prior messages for that luminaire. Once a luminaire error has been corrected, clearing prior error codes allows the test to be rerun and verify no new error codes are generated.

Test 88 - Thumbwheel Reading

Entering test setting 88 causes the thumbwheel setting for the selected luminaire to be displayed in the console board control window. Once test setting has been entered, the luminaire thumbwheel can be reset and the new setting will be displayed in the console board control window. When test is complete, return thumbwheel to original setting.

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3.2 Luminaire Fault Isolation

3.2.1 Luminaire Fault Isolation Chart

Assuming that all other system components are working properly and that proper system power has been supplied to the luminaire:

Symptom	Probable Cause	Corrective Action
Luminaire powers up, but will not calibrate	Bad input connection Incorrect form & function setting Bad CIB Bad LCB Bad LVS Bad transformer assembly Bad pan/tilt mechanism (encoder)	para. 3.2.2.1
Luminaire calibrates, but will not come on line	Bad input connection Loose CIB connection Bad CIB Bad LCB	para. 3.2.2.2
Luminaire powers up, but recalibrates repeatedly	Bad LVS	para. 3.2.2.3
Luminaire has no power	Bad input connector Blown voltage selector fuse Bad lamp cable	para. 3.2.2.4
Lamp will not strike	Bad lamp Blown 15 Amp fuse on LVS Bad APS Bad ignitor board Bad lamp wires	para. 3.2.2.5
Intensity iris not working properly	Loose yoke cable connection at mother board Loose yoke cable & iris motor wire connections at YTB Bad CIB Loose/broken belt Bad sensor Dirty or damaged iris leaves Bad Yoke cable	para. 3.2.2.6

Luminaire Fault Isolation Chart (continued)

Assuming that all other system components are working properly and that proper system power has been supplied to the luminaire:

Symptom	Probable Cause	Corrective Action
Color filters not working properly	Loose yoke cable connection at mother board Loose yoke cable connection at YTB Bad CIB Bad LVS Warped color filter Bent color filter wheel Loose/bad motor wire connections Sensor out of adjustment Bad sensor Bad motor Bad Yoke cable	para. 3.2.2.7
Edge control not working properly	Loose yoke cable connection at mother board Loose yoke cable connection at YTB Bad CIB Bad motor Bad Yoke cable	para. 3.2.2.8
Gobo filters not working properly	Loose yoke cable connection at mother board Loose yoke cable connection at YTB Bad CIB Bad LVS Warped Gobo wheel Bent Gobo Loose/bad motor wire connections Sensor out of adjustment Bad sensor Bad motor	para. 3.2.2.9
Improper tilt response	MTA connector unplugged Bad tilt mechanism (belt, motor, encoder, etc.) Bad CIB Bad LVS Bad yoke cable Bad driven pulley	para. 3.2.2.10

Luminaire Fault Isolation Chart (continued)

Assuming that all other system components are working properly and that proper system power has been supplied to the luminaire:

Symptom	Probable Cause	Corrective Action
Improper pan response	Bad CIB Bad LVS Pan cable unplugged Bad pan mechanism (belt, motor, encoder, etc.) Bad driven pulley	para. 3.2.2.11

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3.2.2 Luminaire Fault Isolation Procedures

3.2.2.1 Luminaire Powers Up, But Will Not Calibrate

Assuming the following:

- Console is powered up and working properly.
- Repeater unit is properly connected and working.
- Lamp cable is good.

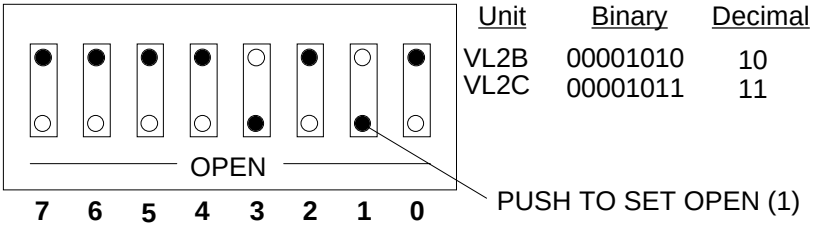
Step 1. At **VL2B/VL2C** lamp input connector, check connection to lamp run cable. Ensure good connection.

Step 2. Hard reset luminaire by removing and then resupplying power to repeater unit.

Step 3. Check form and function setting.

a. Access motherboard. Refer to Motherboard Removal and Replacement paragraph.

b. At the form and function switch, the bit number represented by the switch should be read off the PCB and not the switch itself. The switch depressed on the "open" side represents a binary 1. The form and function switch settings is as follows:



Step 4. Ensure proper CIB, LVS, and LCB connections.

a. At motherboard, ensure all cables are properly and securely connected. Ensure memory card pins are seated properly in LCB.

b. At motherboard, ensure circuit cards are seated properly.

Step 5. If symptom persists, replace CIB, LCB, and/or LVS. Refer to Low Voltage Supply, Lamp Control Board, and Control Interface PCB Removal and Replacement paragraphs.

Step 6. If symptom persists, check transformers.

a. Access transformer location.

b. At transformer assembly, ensure all cables are properly and securely connected. If symptom persists, replace transformer assembly. Refer to Transformer Removal and Replacement paragraph.

Step 7. If symptom persists, replace tilt mechanism. Refer to Tilt Mechanism Removal and Replacement paragraph.

Step 8. If symptom persists, replace pan drive assembly. Refer to Pan Drive Assembly Removal and Replacement paragraph.

3.2.2.2 Luminaire Calibrates, But Will Not Come On-Line

Assuming the following:

- Console is powered up and working properly.
- Repeater unit is properly connected and working.
- Lamp cable is good.

Step 1. At **VL2B/VL2C** luminaire input connector, check connection to lamp run cable. Ensure good connection.

Step 2. Hard reset luminaire by removing and then resupplying power to repeater unit.

Step 3. If symptom persists, remove power to luminaire and check mother board connections.

a. Remove six 6-32x3/8”PPB screws that secure top cover to chassis and remove cover.

c. At luminaire card cadge, ensure all PC boards are securely and properly connected.

Step 4. If symptom persists, replace CIB. Refer to Control Interface PCB Removal and Replacement paragraph.

Step 5. If symptom persists, replace LCB. Refer to Lamp Control PCB Removal and Replacement paragraph.

3.2.2.3 Luminaire Powers Up, but Recalibrates Repeatedly

Assuming the following:

- Console is powered up and working properly.
- Repeater unit is properly connected and working.
- Lamp cable is good.

Step 1. Ensure proper CIB, LVS, and LCB connections.

a. At motherboard, ensure all cables are properly and securely connected. Ensure memory card pins are seated properly in LCB.

b. At motherboard, ensure circuit cards are seated properly.

Step 2. If symptom persists, replace LVS. Refer to Low Voltage Supply Removal and Replacement paragraphs.

3.2.2.4 Luminaire Has No Power

Assuming the following:

- Repeater unit is properly connected and working.
- Lamp cable is good.

Step 1. Inspect **VL2B/VL2C** luminaire input connector.

a. Check connection to lamp run cable. Ensure good connection.

b. Check condition of input connector. Using finger, push on pins to determine if pins are securely seated in housing. Replace connector or pins as needed. Refer to Input Connector Removal and Replacement paragraph.

Step 2. At Voltage Selector PCB, check for blown fuses.

a. Access Voltage Selector PCB. Refer to Voltage Selector Board Fuses Removal and Replacement paragraph. Replace fuses as needed.

3.2.2.5 Lamp Will Not Strike

Step 1. Listen to luminaire while attempting to start lamp.

a. If "clicking" sound can be heard, inspect/replace lamp. Refer to Lamp Assembly Lamp Removal and Replacement paragraph.

b. If rapid "machine gun clicking" sound can be heard, replace Ignitor Board. Refer to Ignitor Board Removal and Replacement paragraph.

c. If no "clicking sound can be heard, check 15A fuses on VSB.

Step 2. If symptoms persist, replace APS.

Step 3. If symptoms persist, inspect/replace lamp wires. Refer to Yoke Cables and Lamp Wire Removal and Replacement paragraph.

3.2.2.6 Intensity Iris Not Working Properly

Step 1. Open electronics chassis to gain access to motherboard.

Step 2. At motherboard, ensure good yoke cable connection.

Step 3. Remove head assembly covers to gain access to YTB.

Step 4. At YTB, ensure good yoke cable and iris motor wire connections.

Step 5. At electronics chassis, replace CIB with known good board.

a. If replacement solves problem, then problem is with removed control interface board.

b. If replacement does not solve problem, re-install removed control interface board and continue with next step.

Step 6. At iris assembly, inspect iris belt. Replace belt as necessary. Refer to Brightness/Focus Bulkhead Belt Removal and Replacement paragraph.

Step 7. At sensor bracket, inspect whether bracket is rubbing on iris surface. Bend bracket back or replace as necessary.

Step 8. Rotate iris by hand. If iris does not move or is rough, replace iris assembly. Refer to Brightness/Focus Bulkhead Brightness Iris Removal and Replacement paragraph.

Step 9. If symptom persists, replace Yoke cable. Refer to Yoke Cable Assembly Removal and Replacement paragraph.

3.2.2.7 Color Filters Not Working Properly

Step 1. Open electronics chassis to gain access to mother board.

Step 2. At mother board, ensure good yoke cable connection.

Step 3. Remove head assembly covers to gain access to YTB.

Step 4. At YTB, ensure good yoke cable and color wheel motor wire connections.

Step 5. At electronics chassis, replace CIB with known good board.

a. If new CIB solves problem replace IC2 for WH1 or IC3 for WH2 on faulty CIB and retest . If problem not corrected then return bad CIB.

b. If replacement does not solve problem, re-install removed control interface board and continue with next step.

Step 6. At CFB, inspect color wheels.

a. Clean wheels with glass cleaner as necessary. The optical sensor may misinterpret dirt as sensor tape.

b. Ensure sensor tape is secured to wheel.

c. Check wheels for warping and bent filters. Replace wheels as necessary. Refer to Color Filter Bulkhead Removal and Replacement paragraph.

Step 7. Ensure optical sensors are properly calibrated. Refer to Color and Gobo Wheel Sensor Calibration paragraph.

Step 8. If symptoms persist, replace yoke cable. Refer to Yoke Cable Assembly Removal and Replacement paragraph.

3.2.2.8 Edge Control Not Working Properly

On **VL2B** luminaires a common failure is the lens barrel getting jammed in a extended position. This sometimes happens when the lens is left fully extended when packed into a road case. The lens bearing tube is vibrated and unseats itself during transport.

This simple problem can be avoided if the lens is retracted prior to power down of luminaire. This problem is corrected on the **VL2C** luminaire BFB. A retaining ring was added that prevents the bearing from jamming.

Step 1. Open electronics chassis to gain access to mother board.

Step 2. At mother board, ensure good yoke cable connection.

Step 3. Remove head covers and inspect lens for smooth operation.

a. If no movement is detected or is intermittent, replace BFB bulkhead with good spare and retest. Refer to Brightness/Focus Bulkhead Replacement paragraph.

b. If fault is corrected then problem is in BFB bulkhead. If problem persists then problem is with circuit.

Step 4. Remove head assembly covers to gain access to YTB.

Step 5. At YTB, ensure good yoke cable and linear actuator wire connections.

Step 6. At electronics chassis, replace CIB with known good board.

a. If new CIB solves problem U7 on faulty CIB and retest . If problem not corrected then return bad CIB.

b. If replacement does not solve problem, re-install removed control interface board and continue with next step.

Step 7. At electronics chassis, replace LVS. Refer to Low Voltage Supply Replacement paragraph.

Step 8. At actuator motor, inspect for hot motor. Excessive heat could indicate bad motor. Refer to Brightness/Focus Bulkhead Replacement paragraph.

Step 9. If symptoms persist, replace yoke cable. Refer to Yoke Cable Assembly Removal and Replacement paragraph.

3.2.2.9 Gobo Filters Not Working Properly

Step 1. Open electronics chassis to gain access to mother board.

Step 2. At mother board, ensure good yoke cable connection.

Step 3. Remove head assembly covers to gain access to YTB.

Step 4. At YTB, ensure good yoke cable and iris motor wire connections.

Step 5. At electronics chassis, replace CIB with known good board.

a. If new CIB solves problem replace IC U5 on faulty CIB and retest . If problem not corrected then return bad CIB.

b. If replacement does not solve problem, re-install removed control interface board and continue with next step.

Step 6. At GBP, inspect gobo wheel.

a. Clean wheel with glass cleaner as necessary. The optical sensor may misinterpret dirt as sensor tape.

b. Ensure sensor tape is secured to wheel.

c. Check wheel for warping and bent filters. Replace wheels as necessary. Refer to Gobo/Beam Projector Removal and Replacement paragraph.

d. Check for Gobos hitting Beam Iris. Replace as necessary.

Step 7. Ensure optical sensors are properly calibrated. Refer to Color and Gobo Wheel Sensor Calibration paragraph.

3.2.2.10 Improper Tilt Response

Step 1. Open electronics chassis.

Step 2. At motherboard, ensure good yoke cable connection.

Step 3. Remove head assembly covers.

Step 4. At yoke termination board, ensure proper connection.

a. 5-pin connector from TILT header marked TILT ENC.

b. 4-pin connector from TILT header marked TILT.

Step 5. If symtom persists, replace CIB with known good PCB.

Step 6. If symptom persists, replace LVS. Refer to Low Voltage Supply Removal and Replacement paragraph.

Step 7. If symptom persists, replace tilt mechanism. Refer to Tilt Mechanism Removal and Replacement paragraph.

Step 8. If symptom persists, replace yoke cables. Refer to Yoke Cables and Lamp Wire Removal and Replacement paragraph.

3.2.2.11 Improper Pan Response

Step 1. Open electronics chassis.

Step 2. At motherboard, ensure good pan cable connection.

Step 3. Replace CIB with known good PCB. Refer to Control Interface PCB Removal and Replacement paragraph.

Step 4. If symptom persists, replace LVS. Refer to Low Voltage Supply Removal and Replacement paragraph.

Step 5. Access pan drive assembly. Refer to Pan Drive Assembly Removal and Replacement paragraph.

a. Check pan mechanism MTA connector. Ensure good connection.

b. Ensure that belt is not damaged or loose.

c. Ensure that driven pulley is not worn or damaged.

d. Replace pan drive assembly as needed.

3.3 Luminaire Maintenance Procedures

3.3.1 Brightness/Filter Bulkhead Maintenance

3.3.1.1 Brightness/Filter Bulkhead Removal and Replacement

Parts:

1 EA ASSY, VL2B BRIGHTNESS/FOCUS BULKHEAD, (22.9631.0028)

1 EA ASSY, VL2C BFB (BRIGHTNESS/FOCUS BULKHD) (22.9637.0005)

Tools:

Screwdriver, Phillips #2

To remove and replace brightness/focus bulkhead:,

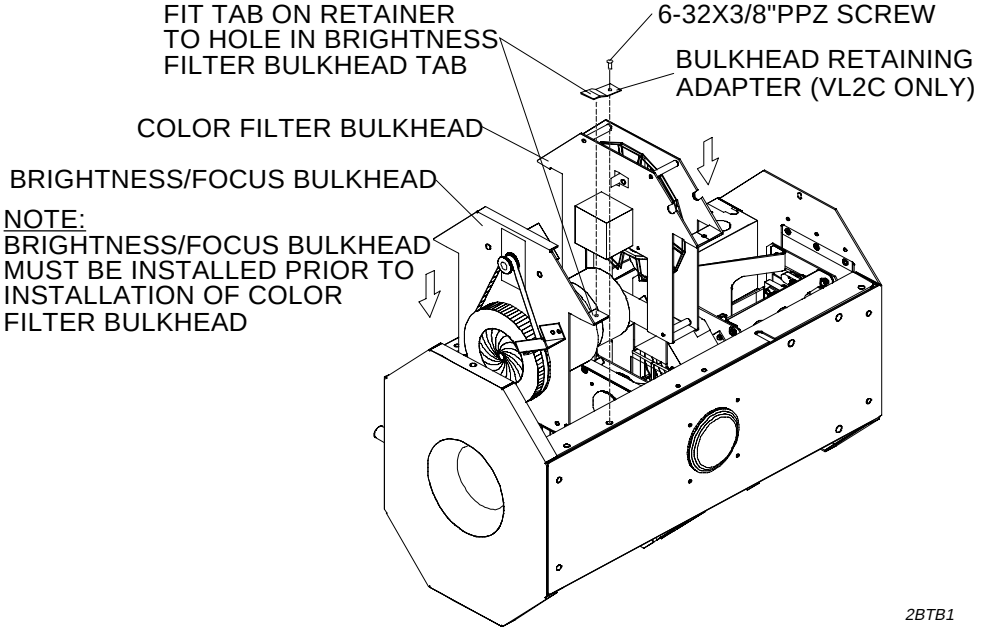


Figure 3-1. Brightness/Focus Bulkhead Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove head covers.

a. Remove 20, 6-32x5/16"PFB screws that secure head covers to rails. Remove both head covers.

Step 3. Disconnect brightness/focus bulkhead and color filter bulkhead yoke termination board connectors.

a. At yoke termination board (**Figure 3-2**), disconnect the following IDC connectors:
   1. Brightness/filter bulkhead four-pin connector from header marked IRIS E.T. (rev. C board) or DIM EOT (rev. D board).
   2. Brightness/filter bulkhead six-pin connector from header marked DIM IRIS (rev C board) or DIM (rev. D board).

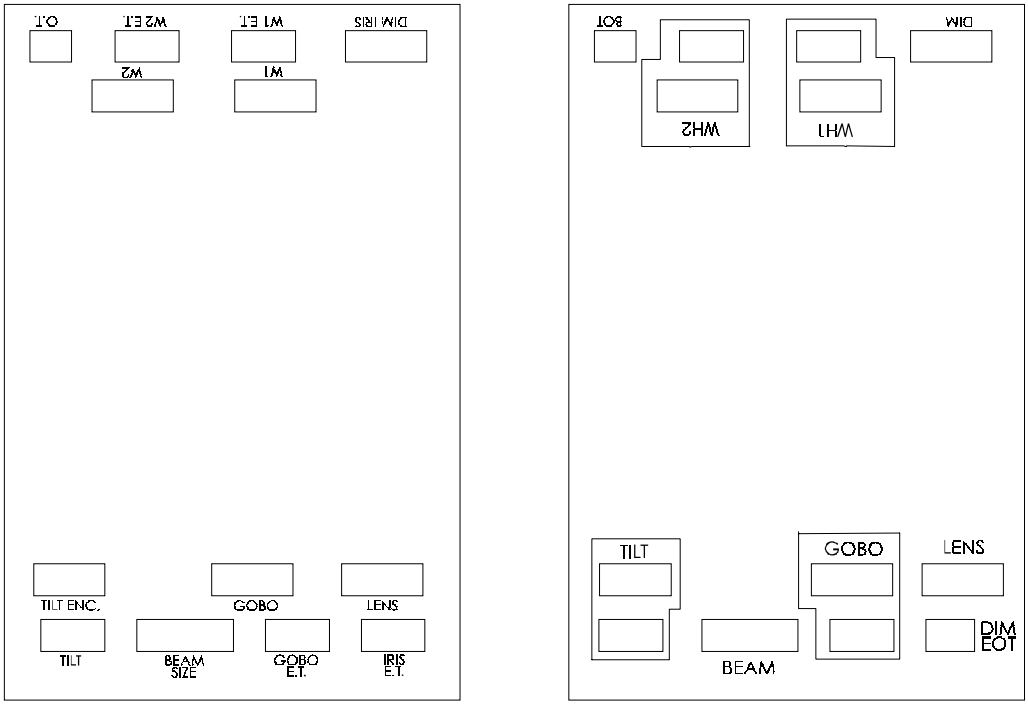


Figure 3-2. Yoke Termination Board Connector Locations

   3. Brightness/filter bulkhead six-pin connector from header marked LENS.
   4. Color filter bulkhead two-pin connector of assembly from header marked O.T. (rev. C board) or BOT (rev. D board).
   5. Color filter bulkhead four-pin connector marked I from header marked W1 E.T. (rev. C board) or WH1 (rev. D board).
   6. Color filter bulkhead four-pin connector marked II from header marked W2 E.T. (rev. C board) or WH2 (rev. D board).
   7. Color filter bulkhead six-pin connector marked I from header marked W1 (rev. C board) or WH1 (rev. D board)

8. Color filter bulkhead six-pin connector marked II from header marked W2 (rev. C board) or WH2 (rev. D board).

Step 4. Remove color filter bulkhead.

a. At color filter bulkhead assembly, remove two 6-32x3/8"PPB screws that secure shroud and color filter bulkhead to head and remove shroud.

b. Slide out color filter bulkhead from head.

Step 5. Remove brightness/focus bulkhead.

a. For **VL2B** luminaire, remove two 6-32x3/8"PPB screws and 0.434 inch OD x 0.156 inch ID x 0.062 inch thick flat washers that secure brightness/focus bulkhead to side rails.

b. For **VL2C** luminaire, remove two 6-32x3/8"PPB screws and two bulkhead retaining adapters that secure brightness/focus bulkhead to side rails.

c. Slide out brightness/focus bulkhead from head.

Step 6. Replace brightness/focus bulkhead by doing Steps 2 through 5 in reverse.

3.3.1.2 Brightness/Focus Bulkhead Brightness Iris Removal and Replacement

Parts:

1 EA ASSY, BRIGHTNESS IRIS (22.1011.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Spacer, 0.05 inch
Nutdriver, 3/16 inch
Nutdriver, 5/16 inch
Loctite 242

To remove and replace brightness/focus bulkhead brightness iris assembly:

Step 1. Remove power to luminaire.

Step 2. Remove head assembly covers.

Step 3. Remove brightness/focus bulkhead. Refer to Brightness/Filter Bulkhead Maintenance paragraph.

Step 4. Remove focus lens mounting tube from brightness/focus bulkhead.

a. At linear actuator motor shaft, disconnect focus lens mounting tube from linear actuator motor.
   1. For **VL2B** luminaire, using 3/16 inch nut driver, remove 2-56 nut and #2 split flat washer from end of shaft securing focus bearing tube to motor shaft (**Figure 3-3**).
   2. For **VL2C** luminaire, using 5/16 inch nut driver, remove 4-40 KEPS nut from end of shaft securing focus bearing tube to motor shaft

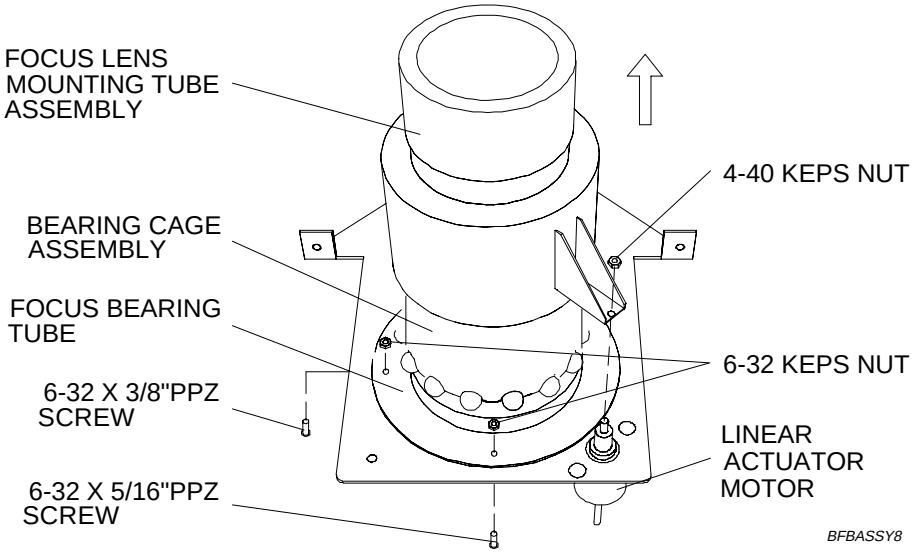


Figure 3-3. Separating Focus Lens Mounting From Bulkhead

b. At focus bearing tube, remove two 6-32x5/16"PPZ screws and two 6-32x3/8"PPZ screws and four KEPS nuts that secure focus bearing tube to bulkhead and remove focus bearing tube.

Note: 6-32x3/8"PPZ screws that secure focus bearing tube also secure two cable clamps.

Step 5. Remove sensor switch bracket.

a. At sensor switch bracket, remove two 6-32x5/16"PPB screws that secure bracket to bulkhead and remove bracket (**Figure 3-4**).

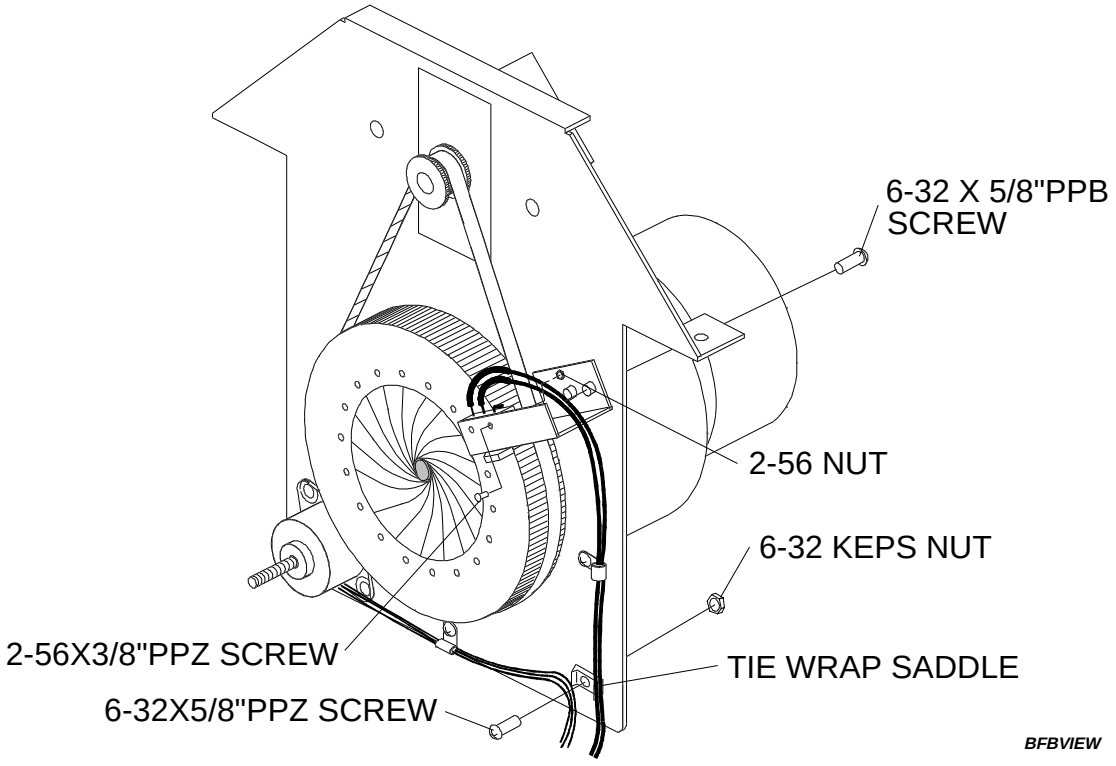


Figure 3-4. Brightness/Filter Bulkhead Sensor Switch Removal and Replacement

Step 6. Remove brightness iris.

a. At brightness iris, remove three 6-32x5/8"PPZ screws and #6 flat washers that secure brightness iris to bulkhead, remove belt, and remove brightness iris.

Step 7. Install replacement brightness iris and re-assemble luminaire.

a. Install replacement brightness iris on front of brightness/focus bulkhead and open iris.

b. Align three holes in brightness iris to holes in three black grommets in bulkhead. For correct alignment of sensor pin on iris, place sensor stop opposite brass hole plug.

c. Put #6 flat washer on each 6-32x5/8"PPZ screw and apply Loctite 242 to screws.

d. Insert screws into iris assembly and grommets and partially thread screws. Do not fully tighten screws.

e. Place 0.05 inch spacer between brightness iris and bulkhead and fully tighten screws. Space must be maintained to prevent grommets from rubbing against inside of iris.

f. Install timing belt on iris pulley and then place around pulley.

g. Install sensor and close iris. Verify that when sensor is actuated, brass Pupil Obstruction Device (pod) in middle completely covers iris opening, not permitting any light to pass through. Diameter of opening should be 1/4 inch. If iris is not completely blocked, bend pod in direction of cover iris opening. Ensure that pod is perfectly centered in iris opening.

h. Using adjustable screw on motor mount, adjust pulley until belt is taut. Ensure smooth operation of brightness iris assembly by using pulley to open and close iris.

i. Complete replacement by doing Steps 2 through 5 in reverse.

3.3.1.3 Brightness/Focus Bulkhead Belt Removal and Replacement

Parts:

1 EA BELT, BFB, VL2B, .0800P, 188T, .250W, NO CORD (54.2009.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

To remove and replace brightness/focus bulkhead belt:

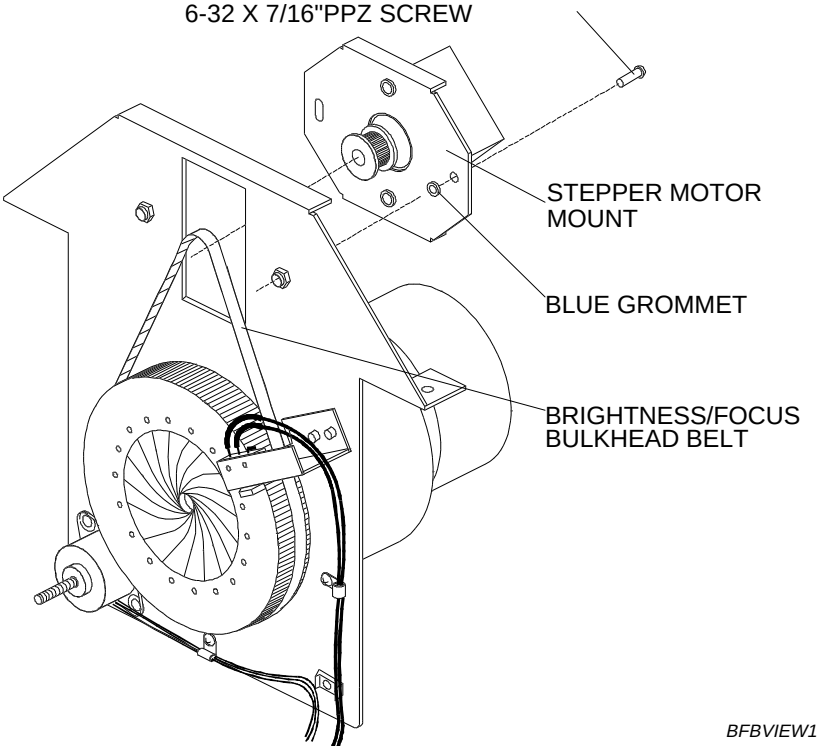


Figure 3-5. Brightness/Focus Bulkhead Belt Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove head assembly covers.

Step 3. Remove brightness/focus bulkhead from luminaire. Refer to Brightness/Filter Bulkhead Removal and Replacement paragraph.

Step 4. Remove belt from brightness/focus bulkhead.

a. Remove belt from pulley on shaft of stepper motor.

b. Rotate iris actuator so that iris stop is away from sensor switch and slide out belt from under sensor switch.

Step 5. Install new belt on bulkhead and re-assemble luminaire head by doing Steps 2 and 4 in reverse (**Figure 3-6**).

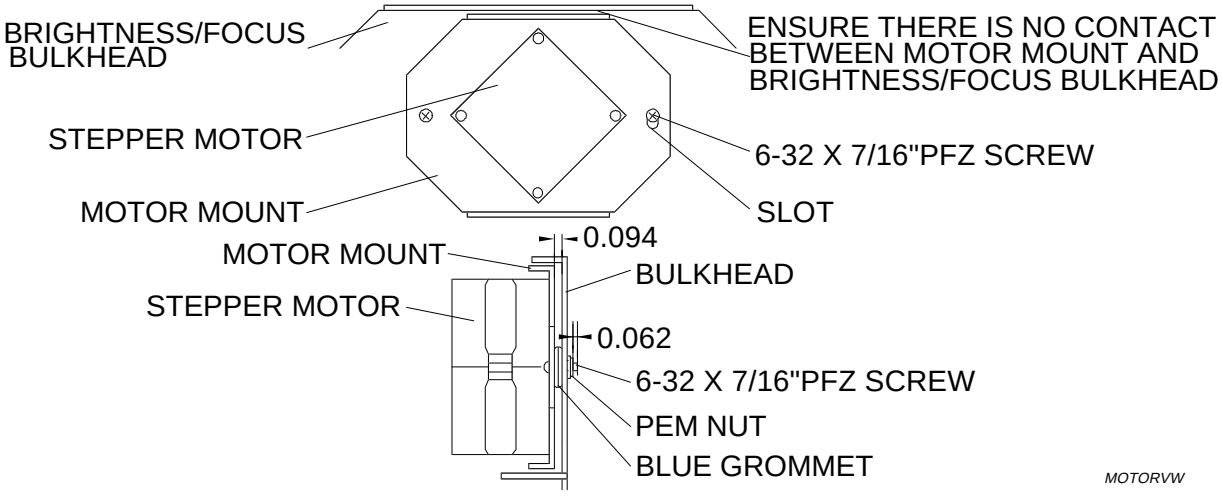


Figure 3-6. Brightness/Focus Bulkhead Belt Replacement Tolerances

3.3.1.4 Brightness/Focus Bulkhead Sensor Switch Removal and Replacement

Parts:

1 EA ASSY, MICROSWITCH W/24 AWG WIRES (22.1023.0003)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters
MTA100 hand crimper

To remove and replace brightness/focus bulkhead sensor switch:

Step 1. Remove power to luminaire.

Step 2. Remove head assembly covers.

Step 3. Remove brightness/focus bulkhead from luminaire head. Refer to Brightness/Filter Bulkhead Removal and Replacement paragraph.

Step 4. Remove brightness/focus bulkhead sensor.

a. At corner of bulkhead, cut off cable tie that holds sensor switch wires to tie wrap saddle.

b. Remove two 4-40x5/16"PPZ screws that secure sensor switch bracket to bulkhead and remove sensor bracket (with sensor).

c. Remove two 2-56x3/8"PPZ screws and 2-56 nuts that secure sensor to sensor bracket and remove sensor (**Figure 3-7**).

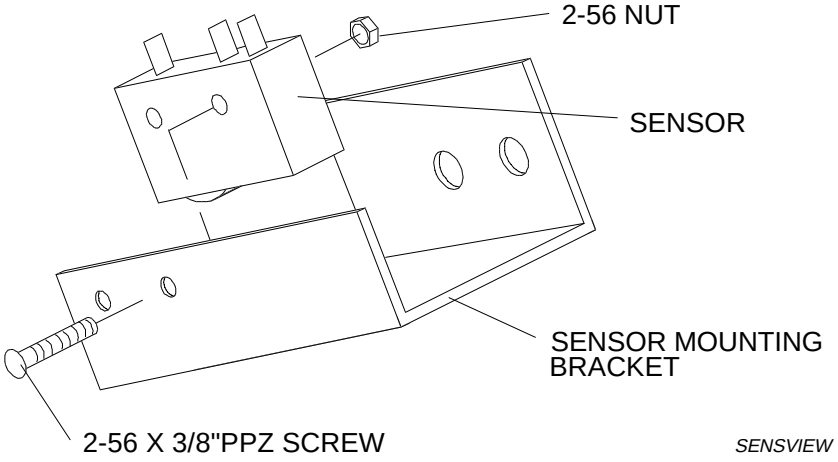


Figure 3-7. Brightness/Focus Bulkhead Sensor Switch Removal and Replacement

Step 5. Replace sensor and re-assemble luminaire.

a. At replacement sensor, using the following pinouts, crimp sensor wires to four-pin MTA100 connector saved during removal.

Pin	Wire
4	Blue
3	Blue
2	Not Used
1	Not Used

b. Complete sensor replacement by doing Steps 2 thru 4 in reverse.

Note: It is absolutely essential that diameter of iris opening be 1/4 inch when sensor switch clicks on contact with iris stop and not when button of sensor switch is fully pressed into switch housing by iris stop. Any deviation from specified diameter will adversely affect luminaire performance.

3.3.1.5 Brightness/Focus Bulkhead Linear Actuator Motor Removal and Replacement

Parts:

1 EA MOTOR, LINEAR ACTUATOR 12V (**VL2B**) (44.5013.0001)

1 EA MOTOR, LINEAR ACTUATOR, VL2C FOCUS BLKHD (44.5019.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters
MTA100 hand crimper
Nut driver, 3/16 inch

To remove and replace brightness/focus bulkhead linear actuator motor:

Step 1. Remove power to luminaires.

Step 2. Remove head assembly covers.

Step 3. Remove brightness/focus bulkhead. Refer to Brightness/Filter Bulkhead Removal and Replacement paragraph.

Step 4. Remove linear actuator motor from bulkhead.

a. At corner of bulkhead, cut off cable tie with holds linear actuator motor wires to tie wrap saddle.

b. At end of linear actuator motor shaft disconnect motor from focus lens mounting tube assembly.
   i. For **VL2B** luminaire, using 3/16 inch nutdriver, remove 2-56 nut and #2 split lock washer (**Figure 3-3**).
   ii. For **VL2C** luminaire, using 5/16 inch nutdriver, remove 4-40 KEPS nut.

c. Remove motor from bulkhead (**Figure 3-8**).

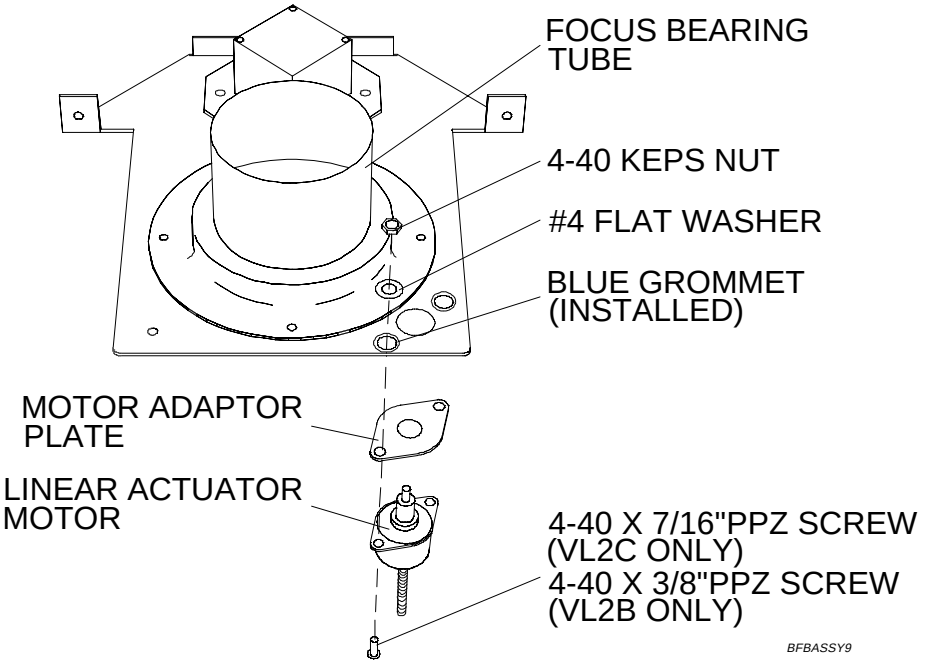


Figure 3-8. Brightness/Focus Bulkhead Linear Actuator Motor Removal and Replacement

i. For **VL2B** luminaire, remove two 4-40x3/8"PPZ screws and two 4-40 KEPS nuts that secure motor to bulkhead and remove motor.

ii. For **VL2C** luminaire, remove two 4-40x7/16"PPZ screws and two 4-40 KEPS nuts that secure motor to bulkhead and remove motor.

Step 5. Install replacement linear actuator motor and re-assemble luminaire.

a. At replacement motor, trim wires.
   1. For **VL2B** luminaire, trim lengths to 10 inches.
   2. For **VL2C** luminaire, do not trim motor wires.

b. Using MTA100 hand crimper and the following pinouts, crimp wires of replacement motor to six-pin MTA100 connector:

VL2B	
Pin	**Wire**
6	Brown
5	Black
4	Orange
3	Green
2	Yellow
1	Red

VL2C	
Pin	**Wire**
6	Blue
5	Green
4	Red
3	Black
2	White
1	White

c. Install new motor and re-install brightness/focus bulkhead into luminaire head by doing Steps 2 thru 4 in reverse.

3.3.2 Gobo/Beam Projector Maintenance

3.3.2.1 Gobo/Beam Projector Removal and Replacement

Parts:

1 EA ASSY, GOBO/BEAM BULKHEAD PROJECTOR (VL2B) (22.1001.0001)

1 EA ASSY, VL2C GBP (GOBO/BEAM PROJECTOR) (22.9637.0004)

Tools:

Screwdriver, Phillips #2

To remove and replace gobo/beam projector:

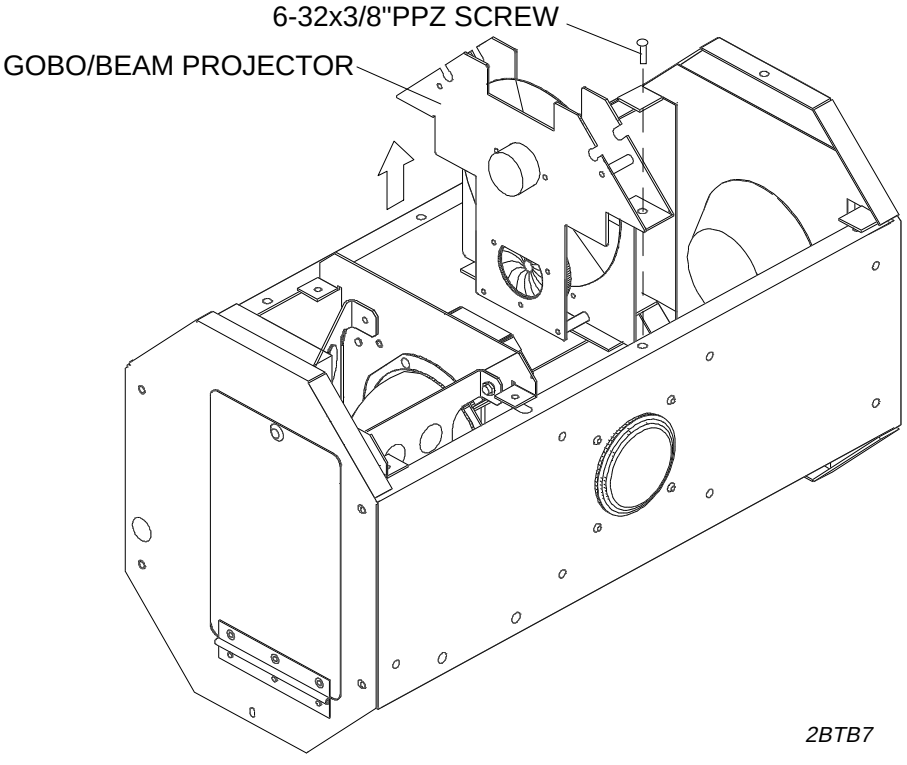


Figure 3-9. Gobo/Beam Projector Assembly Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove ten 6-32x5/16"PFB screws that secure head cover to side rails and remove gobo side head cover.

Step 3. Remove gobo/beam projector.

a. Disconnect gobo/beam projector yoke termination board connectors.
   1. At yoke termination board (**Figure 3-2**), remove the following gobo/beam projector IDC connectors:
   2. Eight-pin connector from header marked BEAM SIZE (rev. C board) or BEAM (rev. D. board).
   3. Four-pin connector from header marked GOBO E.T. (rev C. board) or in area marked GOBO (rev D board).
   4. Six-pin connector from header marked GOBO.

b. At gobo/beam projector bulkhead, remove grommets fitted to tilt cable from holes.

c. At gobo/beam projector, remove two 6-32x3/8"PPZ screws that secure gobo/beam projector to side rails and remove gobo/beam projector.

Step 4. Replace gobo/beam projector bulkhead by doing Steps 2 and 3 in reverse.

3.3.2.2 Gobo/Beam Projector Sensor Removal and Replacement

Parts:

1 EA SENSOR, REFLECTIVE OPB700AL (86.7001.0002)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters
Wrench, 1/4 inch, open end
MTA100 hand crimper

To remove and replace gobo/beam projector sensor:

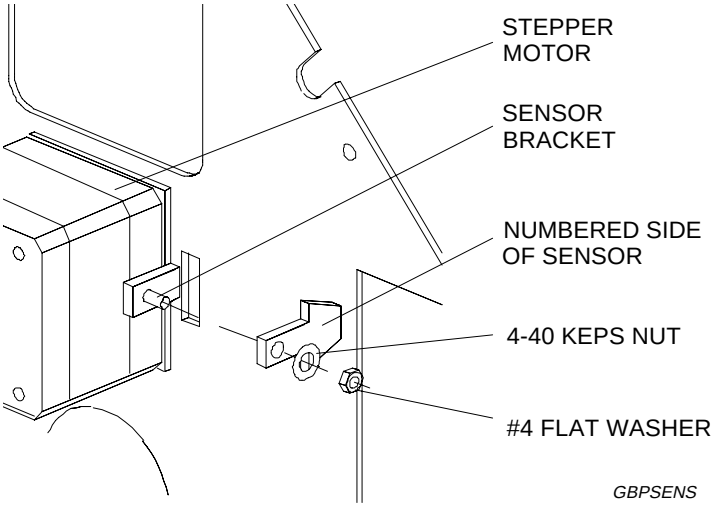


Figure 3-10. Gobo/Beam Projector Sensor Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove head assembly covers.

Step 3. Remove gobo/beam projector. Refer to paragraph 3-6.

Step 4. Remove gobo/beam projector sensor.

a. Remove tie wraps from around sensor wires.

b. At sensor mount bracket, using 1/4 inch open end wrench, remove 4-40 KEPS nut and #4 flat washer that secure sensor to sensor mount bracket and remove sensor.

Step 5. Prepare replacement sensor and replace sensor on bulkhead.

a. At replacement sensor, trim wires to 9 inches.

b. Using MTA100 hand crimper, crimp sensor wires to blue, four-pin MTA100 connector using the following pinouts:

Pin	Wire
4	Green
3	White
2	Black
1	Red

c. Install replacement sensor and return gobo/beam projector assembly to luminaire head by doing Steps 2 and 3 in reverse. Install tie wraps.

Step 6. Calibrate sensor. Refer to Color and Gobo Wheel Sensor Calibration paragraph.

3.3.2.3 Gobo/Beam Projector Beam Size Iris Removal and Replacement

Parts:

1 EA ASSY, BEAM SIZE IRIS (22.1013.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters

To remove and replace beam size iris:

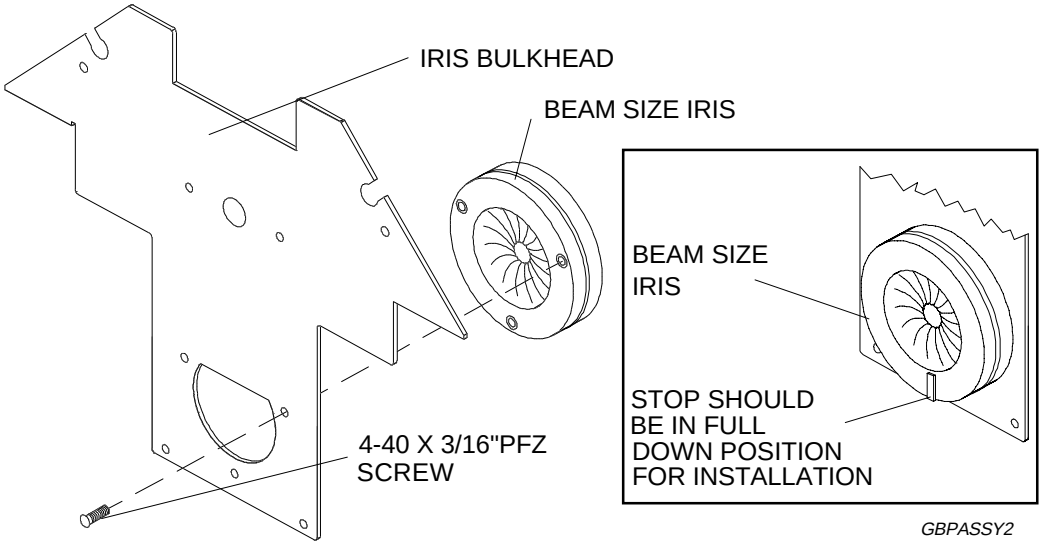


Figure 3-11. Beam Size Iris Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove head assembly covers.

Step 3. Remove gobo/beam projector. Refer to Gobo/Beam Projector Removal and Replacement paragraph.

Step 4. Separate gobo/beam projector bulkheads.

a. At gobo bulkhead, remove top two 6-32x5/16"PPZ screws and bottom two 4-40x1/4"PFZ screws. One of top 6-32x5/16"PPZ screws secures tie wrap saddle to gobo bulkhead (**Figure 3-12**).

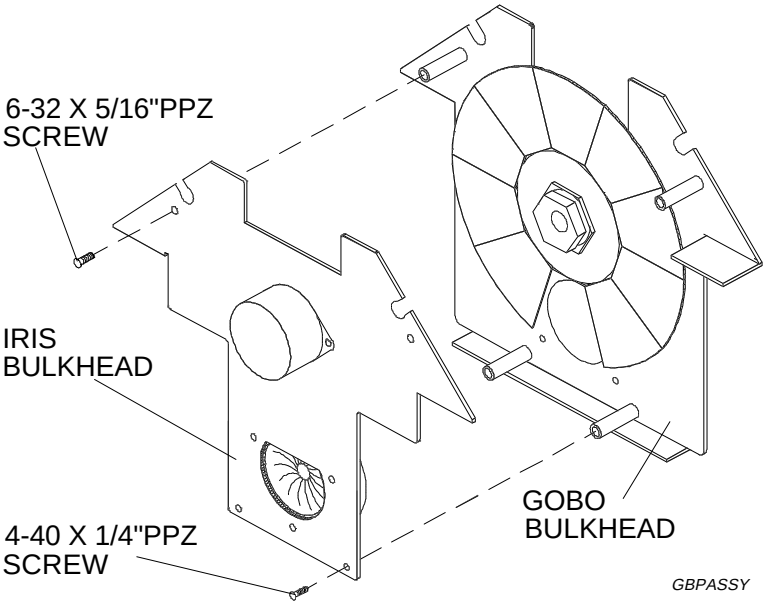


Figure 3-12. Separating Gobo/Beam Projector Gobo Bulkhead From Iris Bulkhead

b. Using diagonal cutters, cut tie wrap that secures gobo stepper motor and iris stepper motor wires to saddle.

c. Slide out grommet from gobo bulkhead.

d. Separate iris bulkhead from gobo bulkhead.

Step 5. Remove beam size iris from bulkhead.

a. Remove 4-40x3/16"PFZ screws that secure beam size iris to iris bulkhead.

b. Unwind stainless steel Teflon-coated cable from iris stepper motor pulley and remove beam size iris assembly from iris bulkhead.

Step 6. Install replacement beam size iris assembly and re-assemble luminaire by doing Steps 2 through 5 in reverse. Wrap cable around iris stepper motor pulley two times.

3.3.2.4 Gobo/Beam Projector Gobo Removal and Replacement

Tools:

White cotton gloves
Screwdriver, flat head

To remove and replace gobo:

Step 1. Remove power to luminaire.

Step 2. Orient luminaire head so gobo access door faces up (away from electronics chassis). Using screwdriver, open access door by rotating 1/4 turn fastener..

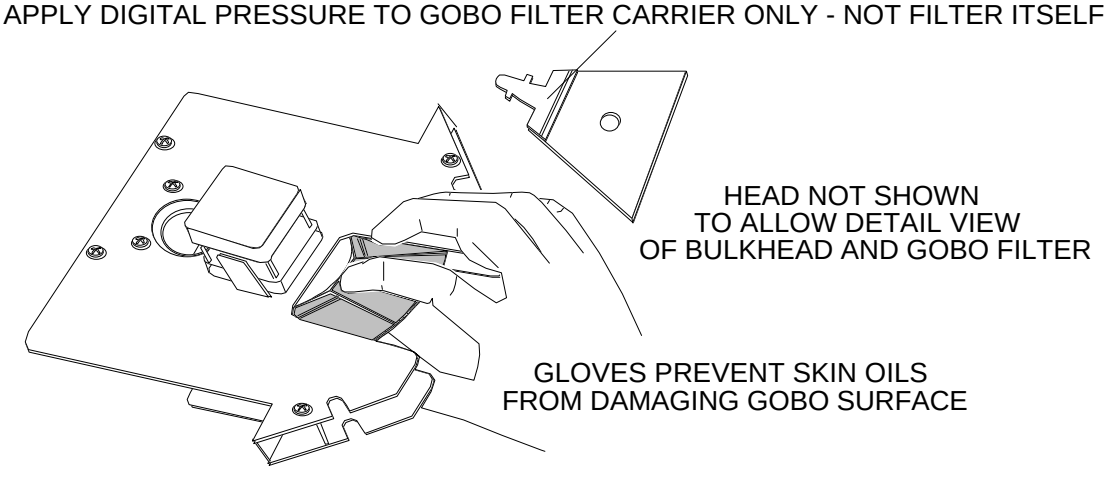


Figure 3-13. Gobo/Beam Projector Gobo Removal and Replacement

CAUTION: When handling glass gobos, wear cotton gloves to prevent dirt and oil on skin from damaging gobo surface.

Step 3. Place thumb on iris motor side of gobo filter bulkhead for leverage. Using index finger, apply limited pressure to carrier portion of gobo filter until carrier tabs disengage from gobo wheel and spring assembly.

Step 4. Carefully slide out carrier from gobo wheel and spring assembly to about 1/4 inch. Do not try to fully pull out gobo yet.

Step 5. Slide thumb under bottom of gobo to get better grip on gobo.

Step 6. Slowly pull out remainder of carrier from gobo wheel and spring assembly.

3.3.3 Color Filter Bulkhead Maintenance

3.3.3.1 Color Filter Bulkhead Removal and Replacement

Parts:

1 EA ASSY, VL2B COLOR FILTER BULKHEAD (22.9631.0029)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters

To remove and replace color filter:

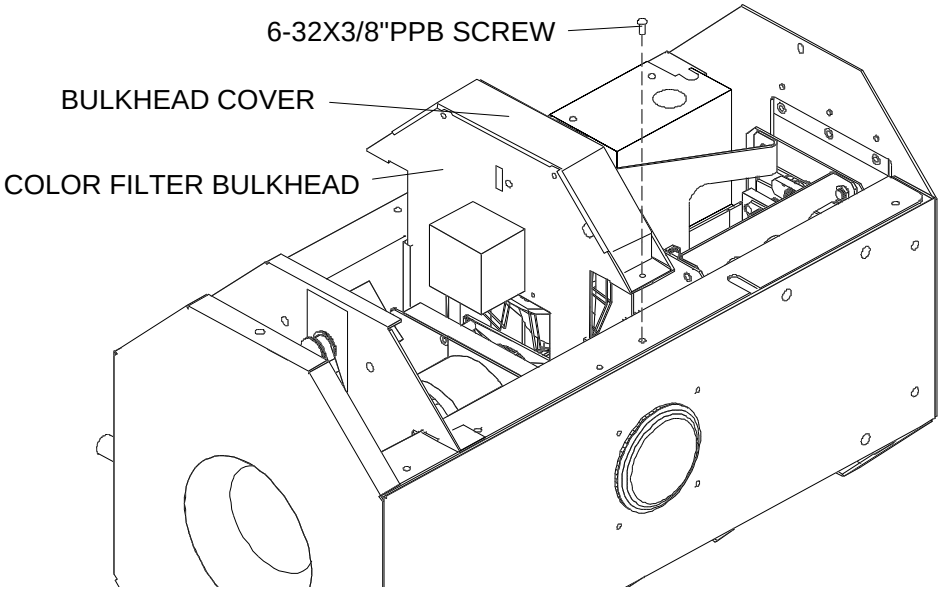


Figure 3-15. Color Filter Bulkhead Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Orient luminaire head so gobo access door faces down (toward electronics chassis).

Step 3. Remove top facing head cover.

a. Remove 10, 6-32x5/16"PFB screws that secure head cover to side rails and remove head cover.

Step 4. Remove color filter bulkhead from luminaire.

a. At yoke termination board (**Figure 3-2**), remove the following color filter bulkhead MTA connectors:
   i. Two-pin connector from header marked O.T. (rev. C board) or BOT (rev. D board).
   ii. Four-pin connector marked I from header marked W1 E.T. (rev. C board) or in area marked WH1 (rev. D board).
   iii. Four-pin connector marked II from header marked W2 E.T. (rev. C board) or in area marked WH2 (rev. D board).
   iv. Six-pin connector marked I from header marked W1 (rev. C board) or WH1 (rev. D board).
   v. Six-pin connector marked II from header marked W2 (rev. C board) or WH2 (rev. D board).

b. At color filter bulkhead assembly, remove two 6-32x3/8"PPB screws that secure bulkhead to side rails and remove bulkhead. Set bulkhead cover aside.

Step 5. Replace color filter bulkhead by doing Steps 3 and 4 in reverse.

3.3.3.2 Color Filter Bulkhead Sensor Removal and Replacement

Parts:

1 EA SENSOR, REFLECTIVE OPB700AL (86-7001-0002)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Diagonal cutters
MTA100 hand crimper

To remove and replace either color filter bulkhead:

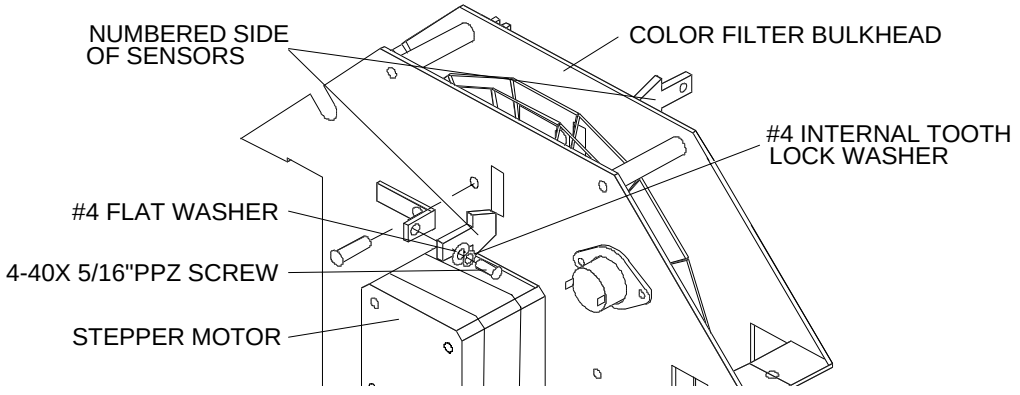


Figure 3-16. Color/Filter Bulkhead Sensor Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove color filter bulkhead. Refer to Color Filter Bulkhead Removal and Replacement paragraph.

Step 3. Remove sensor from bulkhead.

a. Using diagonal cutters, cut tie wraps holding sensor wires.

b. For color wheel 2 bulkhead, remove grommets from bulkhead and remove sensor wires from grommet.

c. At sensor, remove 4-40x5/16"PPZ screw and #4 flat washer.

Step 4. Install replacement sensor.

a. Using MTA100 hand crimper, crimp sensor wires to blue four-pin MTA100 connector using the following pinouts:

Pin	Wire
4	Green
3	White
2	Black
1	Red

b. Install new sensor by doing Steps 2 and 3 in reverse. Verify that sensor is oriented with marked side of sensor away from sensor bracket and sensor points directly through rectangular hole in bulkhead.

Step 5. Calibrate sensor. Refer to Color and Gobo Wheel Sensor Calibration paragraph.

3.3.4 Lamp Assembly Maintenance

3.3.4.1 Lamp Assembly / Lamp Removal and Replacement

Parts:

1 EA LAMP, ARC SNGL ENDED 400W (VL4) (VL2B) (71.2524.0001)

1 EA LAMP, HTI 600W S/E VL2C (71.2527.0001)

To remove and replace lamp assembly / lamp (Figure 3-17):

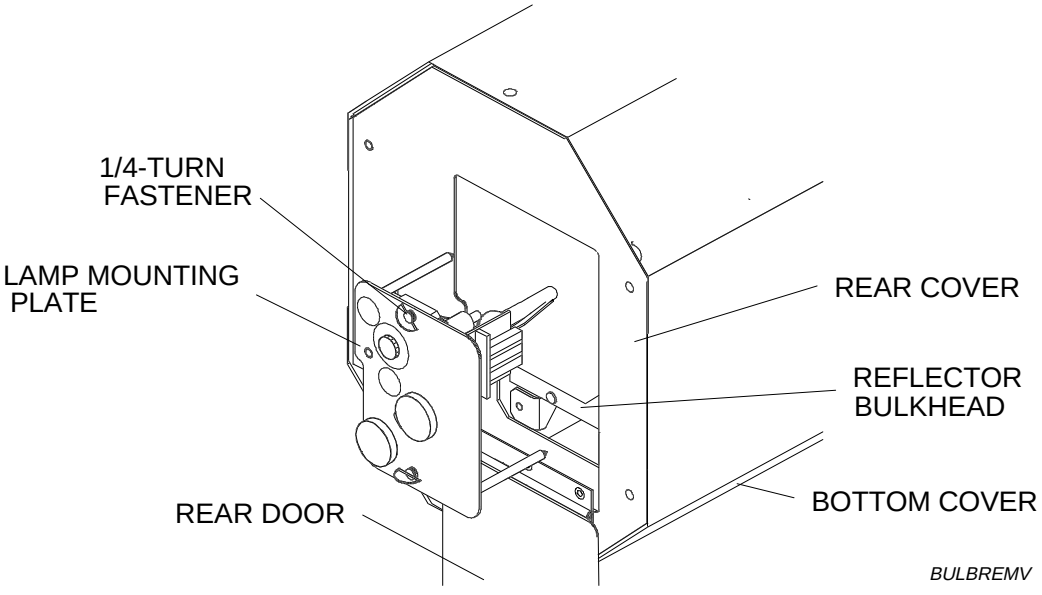


Figure 3-17. Lamp Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove lamp assembly from luminaire.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door.

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

Step 3. Remove lamp from lamp assembly.

a. At lamp carriage, squeeze and lift lamp retainer.

b. Grasp lamp at porcelain base and remove lamp from lamp carriage.

Step 4. Replace lamp by doing Steps 2 and 3 in reverse.

3.3.4.2 Lamp Assembly Socket Removal and Replacement

Parts:

1 EA ASSY, VL2X LAMP SOCKET W/SERIES 30 PINS (22.2521.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, slotted #1
Wrench, 1/4 inch, open end

To remove and replace lamp assembly socket (Figure 3-18):

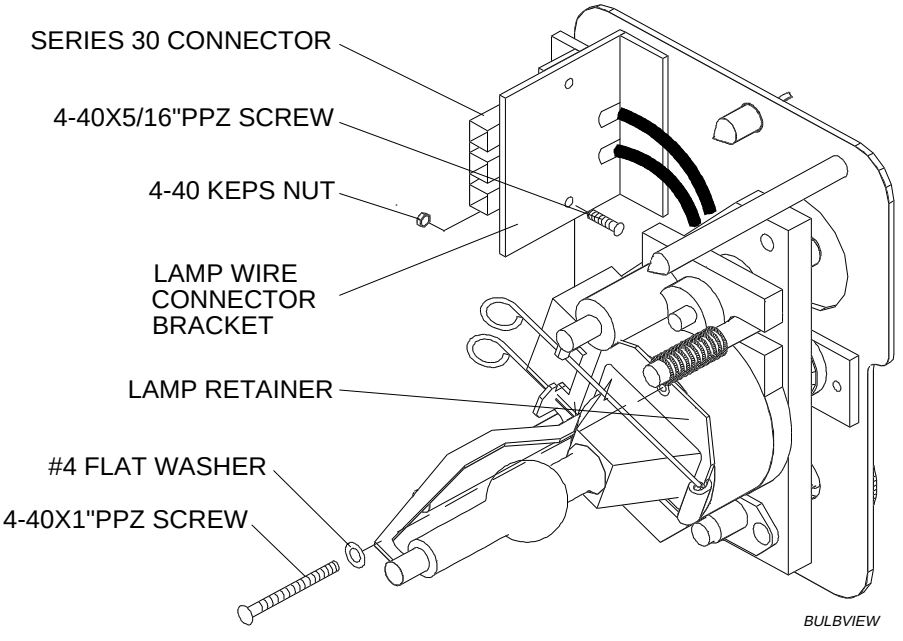


Figure 3-18. Lamp Assembly Bulb Socket Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove lamp assembly from luminaire.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door.

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

Step 3. Remove lamp from lamp carriage.

a. At lamp carriage, squeeze and lift lamp retainer.

b. Grasp lamp at porcelain base and remove lamp from lamp carriage.

Step 4. Remove lamp socket from lamp assembly.

a. At series 30 connector, while using 1/4 inch, open end wrench to hold 4-40 KEPS nuts, remove two 4-40x5/16"PPZ screws and 4-40 KEPS nuts that secure series 30 connector to lamp wire connector bracket.

b. Remove pins 1 and 3 from series 30 connector.

c. At lamp retainer, remove two 4-40x1"PPZ screws and #4 flat washers that secure retainer to lamp socket and remove retainer and lamp socket.

Step 5. Replace lamp socket by doing Steps 2 through 4 in reverse.

3.3.5 Tilt / Pan Mechanism Maintenance

3.3.5.1 Tilt Mechanism Removal and Replacement

Parts:

1 EA ASSY, PAN/TILT MECHANISM (22.1002.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

Note: Pan and tilt mechanisms for **VL2B** and **VL2C** luminaires are identical.

To remove and replace tilt mechanism:

Step 1. Remove power to luminaire.

Step 2. Remove head covers.

a. Remove 20, 6-32x5/16"PFB screws that secure head covers to rails. Remove both head covers.

Step 3. Disconnect all yoke termination board MTA connectors.

a. At yoke termination board (**Figure 3-2**), disconnect the following IDC connectors:
   1. Brightness/focus bulkhead four-pin connector at header marked IRIS E.T. (rev. C board) or DIM EOT (rev. D board).
   2. Brightness/focus bulkhead six-pin connector at header marked DIM IRIS (rev. C board) or DIM (rev. D board).
   3. Brightness/focus bulkhead six-pin connector at header marked LENS.
   4. Color filter bulkhead two-pin connector at header marked O.T. (rev. C board) or BOT (rev. D board).
   5. Color filter bulkhead four-pin connector at header marked W1 E.T. (rev. C board) or in area marked WH1 (rev. D board).
   6. Color filter bulkhead four-pin connector at header marked W2 E.T. (rev. C board) or in area marked WH2 (rev. D board).
   7. Color filter bulkhead six-pin connector at header marked W1 (rev. C board) or WH1 (rev. D board).
   8. Color filter bulkhead six-pin connector at header marked W2 (rev. C board) or WH2 (rev. D board).
   9 Gobo/beam projector four-pin connector at header marked GOBO E.T. (rev. C board) or in area marked GOBO (rev. D board).

10. Gobo/beam projector six-pin connector at header marked GOBO.
11. Gobo/beam projector eight-pin connector at header marked BEAM SIZE (rev. C board) or BEAM (rev. D board).
12. Tilt mechanism four-pin connector at header marked TILT (rev. C board) or in area marked TILT (rev. D board).
13. Tilt mechanism five-pin connector at header marked TILT ENC. (rev. C board) or TILT (rev. D board).

Step 4. Remove color filter bulkhead. Refer to Color Filter Bulkhead Removal and Replacement paragraph.

Step 5. Remove brightness/focus bulkhead. Refer to Brightness/Filter Bulkhead Removal and Replacement paragraph.

Step 6. Remove gobo/beam projector. Refer to Gobo/Beam Projector Removal and Replacement paragraph.

Step 7. Remove lamp assembly from luminaire.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door (**Figure 3-17**).

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

Step 8. Remove reflector assembly.

a. At reflector assembly, remove three 6-32x5/16"PPZ screws that secure reflector assembly to luminaire head and remove reflector assembly (**Figure 3-19**).

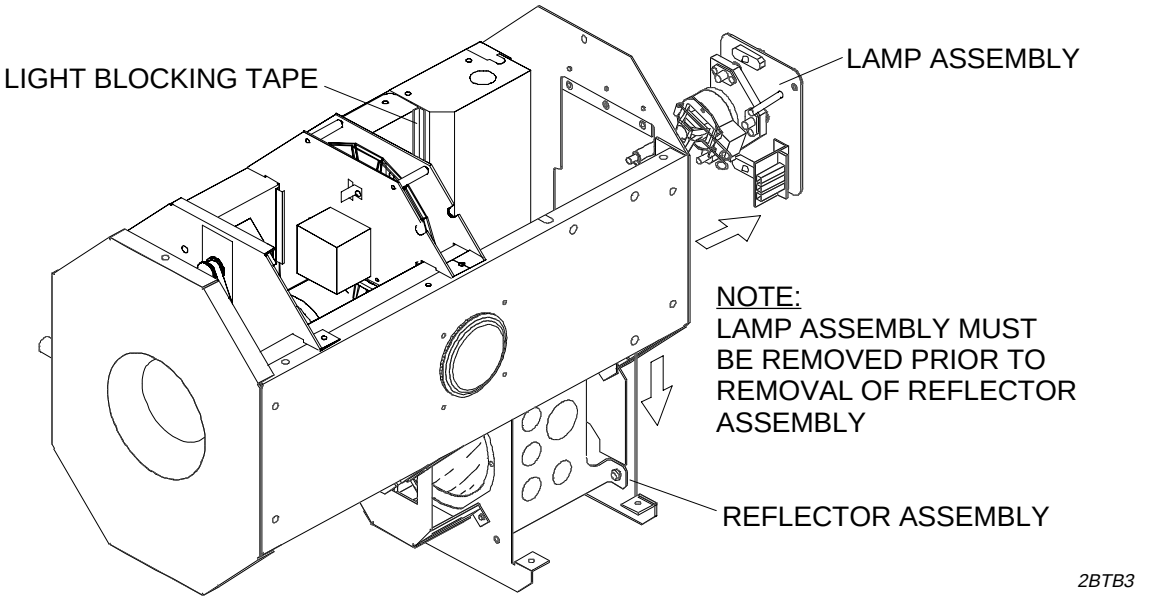


Figure 3-19. Reflector Assembly Removal and Replacement

Step 9. Remove tilt mechanism cover.

a. At tilt mechanism cover, remove four 6-32x5/16"PPB screws that secure cover to pulley side rail and remove tilt mechanism cover (**Figure 3-20**).

Note: Tilt cover and side rail cover may be connected with light blocking tape. If tape is present, leave covers connected when removing.

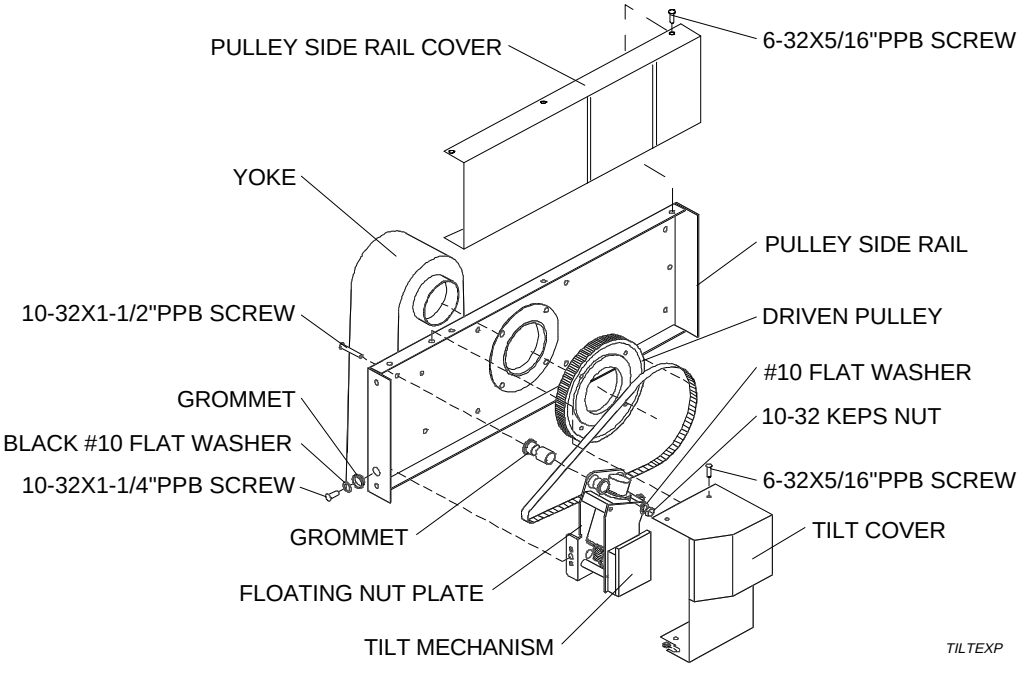


Figure 3-20. Tilt Mechanism Removal and Replacement

Step 10. Remove pulley side rail cover.

a. At bottom of the pulley side rail cover, remove two 6-32x5/16"PPB screws.

b. At top of pulley side rail cover, remove one 6-32x5/16"PPB screw and remove pulley side rail cover.

Step 11. Remove tilt mechanism from luminaire head.

a. At rear cover, remove 10-32x1-1/4"PFB screw and black #10 flat washer from floating-nut plate of tilt mechanism.

b. At tilt mechanism, remove three 10-32 KEPS nuts and #10 flat washers.

c. Remove three 10-32x1-1/2"PFB screws.

d. Free belt from drive pulley on clutch shaft of tilt mechanism and remove tilt mechanism.

Step 12. Install replacement tilt mechanism.

a. Slide belt over pulley on clutch shaft of tilt mechanism. Ensure that belt is in proper position over driven pulley and drive pulley of tilt mechanism.

b. Mount replacement tilt mechanism on pulley side rail.

c. Apply Loctite 242 to three 10-32x1-1/2"PFB screws, fit black #10 flat washer, and insert through pulley side rail into legs of tilt mechanism.

d. Fit black #10 flat washer, and loosely thread 10-32 keps nut onto each screw.

e. Fit black #10 flat washer to 10-32x1-1/4"PPB screw, thread through blue grommet in rear cover, and screw into tilt mechanism floating-nut plate.

f. Tighten three 10-32x1-1/2"PFB screws until three threads on each screw is visible through tilt mechanism legs.

CAUTION: It is essential that tilt mechanism belt be adjusted correctly. Overtightening belt can cause high failure rate.

Step 13. Adjust tension of tilt mechanism belt.

a. Tighten belt adjustment screw and then check tension of belt (**Figure 3-21**).

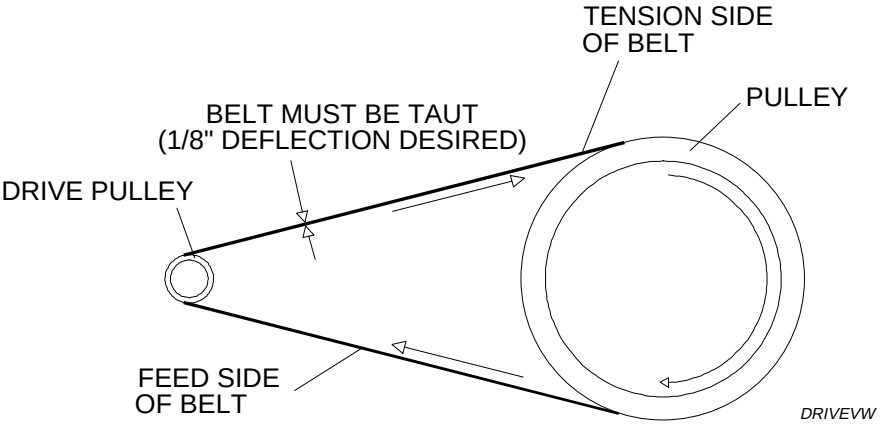


Figure 3-21. Tilt Mechanism Belt Tension Adjustment

b. Turn yoke so that pulleys rotate back and forth. At same time, slowly tighten adjustment screw until both tension and feed sides of belt are taut (1/8” deflection desired).

c. Using finger, check deflection of belt when not in motion. Visual observation of belt may not detect over-tightened belt.

Step 14. Re-assemble luminaire by doing Steps 2 through 10 in reverse.

3.3.5.2 Tilt Mechanism Belt Removal and Replacement

Parts:

1 EA BELT, TILT, VL2B, 1/5P, 95T, .375W, KEVLAR (53.6504.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Loctite 242

To remove and replace tilt mechanism belt, do all steps of tilt mechanism removal and replacement (paragraph 3-16), except do not replace tilt mechanism. See **Figures 2-19** through **2-21**.

3.3.5.3 Pan Mechanism Removal and Replacement

Parts:

1 EA ASSY, PAN/TILT MECHANISM (22.1002.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Loctite 242

To remove and replace pan mechanism (Figure 3-22):

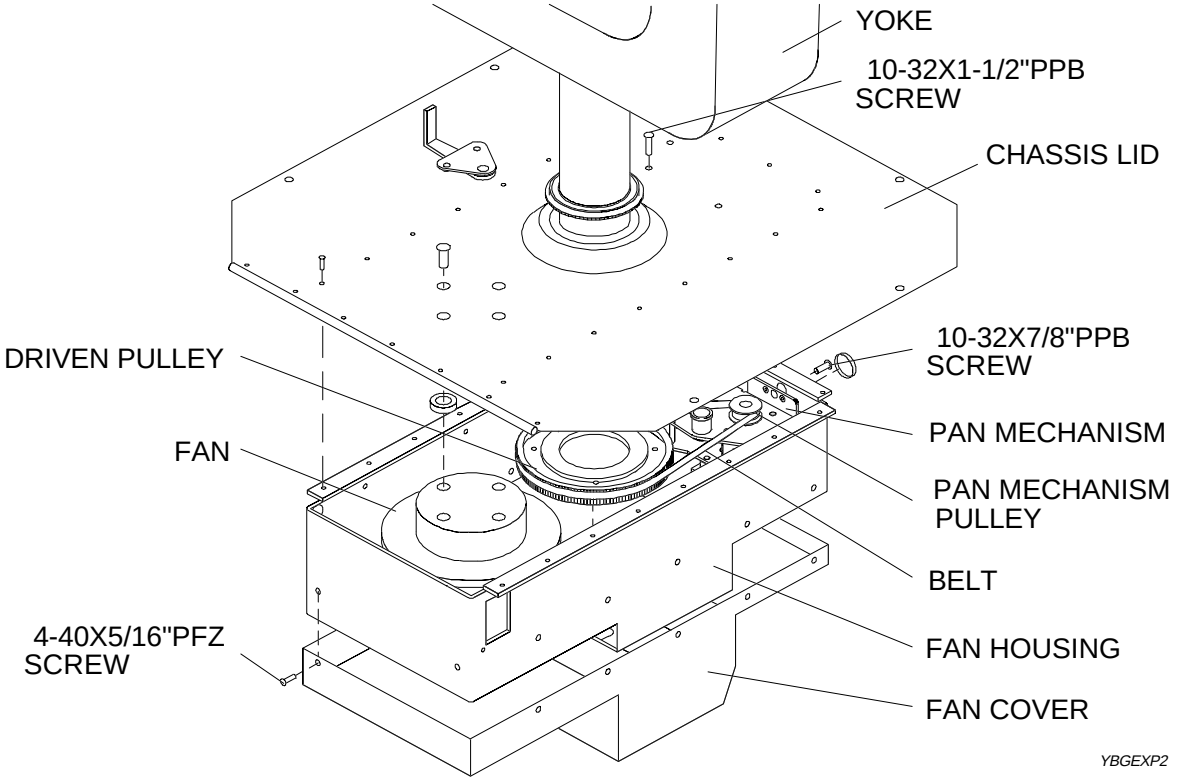


Figure 3-22. Pan Mechanism Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Open chassis lid and remove fan cover.

a. At electronic chassis, remove six 10-32x3/8"PPB screws that secure lid to chassis and open lid.

b. At fan housing, remove 14, 4-40x5/16"PFZ screws that secure fan cover to pan/fan housing and remove fan cover.

Step 3. Disconnect pan mechanism connectors.

a. Disconnect five-pin MTA100 connector of encoder from header crimped to pan-motherboard cable.

b. Disconnect four-pin MTA100 connector of stepper motor from header crimped to pan-motherboard cable.

Step 4. Remove pan mechanism from luminaire.

a. At pan mechanism, remove one 10-32x7/8"PPB screw and black #10 flat washer from floating-nut plate.

b. Remove three 10-32x1-1/2"PPB screws, #10 flat washers, and 10-32 KEPS nuts that secure legs of pan mechanism to lid of upper enclosure (screws are threaded into chassis lid).

c. Free belt from pan mechanism and remove pan mechanism from pan/fan housing.

Step 5. Install replacement pan mechanism in luminaire.

a. Fit belt from driven pulley to drive pulley of pan mechanism.

b. Insert replacement pan mechanism into pan/fan housing.

c. Fit #10 black flat washer to 10-32x7/8"PPB screw and thread screw into blue grommet on pan and pan/fan housing (top side) and into floating nut of pan mechanism.

d. Apply Loctite 242 to three 10-32x1-1/2"PPB screws and insert screws into top of chassis lid and through blue grommets into legs of pan mechanism. Secure screws in place with #10 flat washers and 10-32 KEPS nuts.

e. Connect four- and five-pin IDC connectors to pan-motherboard cable assembly.

Step 6. Adjust tension of pan mechanism belt.

a. Tighten belt adjustment screw and then check tension of belt (**Figure 3-21**).

b. Rotate pulleys back and forth. At same time, slowly tighten adjustment screw until both tension and feed sides of belt are taut (1/8” deflection desired).

c. Using finger, check deflection of belt when not in motion. Visual observation of belt may not detect over-tightened belt.

Step 7. Reassemble luminaire.

a. Secure pan cover to pan/fan housing using 14, 4-40x5/16"PFZ screws.

b. Secure chassis lid to electronics chassis using six 10-32x3/8"PPB screws.

3.3.5.4 Pan Mechanism Belt Removal and Replacement

Parts:

1 EA BELT, PAN, VL2B, 1/5P, 95T, .375W, KEVLAR

(53.6503.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Wrench, Allen, 7/64 inch, T-handle
Wrench, Allen, 5/32 inch
Spacers, two, 0.06 inch (or two medium size tie wraps)
Loctite 242

To remove and replace pan mechanism (Figure 3-22):

Step 1. Remove power to luminaire.

Step 2. Open chassis lid and remove fan cover.

a. At electronic chassis, remove six 10-32x3/8"PPB screws that secure lid to chassis and open lid.

b. At fan housing, remove 14, 4-40x5/16"PFZ screws that secure fan cover to pan/fan housing and remove fan cover.

Step 3. Remove pan mechanism from luminaire.

a. At pan mechanism, remove one 10-32x7/8"PPB screw and black #10 flat washer from floating-nut plate.

b. Remove three 10-32x1-1/2"PPB screws, #10 flat washers, and 10-32 KEPS nuts that secure legs of pan mechanism to lid of upper enclosure (screws are threaded into chassis lid).

c. Free belt from pan mechanism and remove pan mechanism from pan/fan housing.

Step 4. Remove belt from luminaire electronics chassis.

a. Unplug yoke cables from motherboard, lamp wires from APS and disconnect ground wire. Remove by pulling all through Pan/Fan housing.

b. Using 5/32 inch Allen wrench, loosen setscrew in pan shaft collar and remove pan shaft collar from yoke pan tube.

c. Using 7/64 inch T-handle Allen wrench, loosen four 4-40x7/16"SCB screws on pan driven pulley. Use hole in pan/fan housing to reach screws (turn yoke as necessary).

d. Slide out yoke from bearing in chassis lid and remove belt.

Step 5. Install replacement pan mechanism belt.

a. Slide yoke pan tube into first bearing of electronics chassis lid through belt.

b. Slide yoke pan tube into driven pulley assembly.

c. Fit belt to driven pulley.

d. Slide yoke pan tube into second bearing.

e. Install pan shaft collar on yoke pan tube and using 7/64 inch T-handle Allen wrench, tighten setscrew in hub of pan shaft collar. Ensure that hub clamp of pan shaft collar is firmly set against bearing and that there is no vertical movement of yoke pan tube.

f. Place 0.06 inch spacers between pulley and chassis lid. If spacers are not available, medium size tie wraps can be placed flat on both sides of the pulley (one on each side) to act as temporary spacers.

g. Using 5/32 inch Allen wrench, evenly tighten all 6-32x7/16"SCB screws on driven pulley.

h. Remove spacers or tie wraps.

Step 6. Re-install pan mechanism in luminaire.

a. Fit belt from driven pulley to drive pulley of pan mechanism.

b. Insert replacement pan mechanism into pan/fan housing.

c. Fit #10 black flat washer to 10-32x7/8"PPB screw and thread screw into blue grommet on pan and pan/fan housing (top side) and into floating nut of pan mechanism.

d. Apply Loctite 242 to three 10-32x1-1/2"PPB screws and insert screws into top of chassis lid and through blue grommets into legs of pan mechanism. Secure screws in place with #10 flat washers and 10-32 KEPS nuts.

e. Connect four- and five-pin IDC connectors to pan-motherboard cable assembly.

Step 7. Adjust tension of pan mechansim belt.

a. Check tension of pan belt (**Figure 3-21**).

b. Turn yoke so that pulleys rotate back and forth. At same time, slowly tighten adjustment screw until both tension and feed sides of belt are taut (1/8” deflection desired).

c. Using finger, check deflection of belt when not in motion. Visual observation of belt may not detect over-tightened belt.

Step 8. Reassemble luminaire.

a. Feed yoke cables, lamp wires and ground through Pan/Fan housing.

b. Reconnect to motherboard and APS. reconnect ground wire.

c. Secure pan cover to pan/fan housing using 14, 4-40x5/16"PFZ screws.

d. Secure chassis lid to electronics chassis using six 10-32x3/8"PPB screws.

3.3.6 Yoke Cable Assembly Removal and Replacement

Parts:

1 EA CABLE ASSY, VL2B YOKE (25.7019.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Nut driver, 5/16 inch
Diagonal cutters
Loctite 242
Tie wraps
Tape
Permanent black marker
Hook and pick tool

To remove and replace yoke cable assembly:

Step 1. Remove power to luminaire.

Step 2. Remove head covers.

a. Remove 20, 6-32x5/16"PFB screws that secure head covers to rails. Remove both head covers.

Step 3. Disconnect all yoke termination board connectors.

a. At yoke termination board (**Figure 3-2**), disconnect the following connectors:
   1. Brightness/focus bulkhead four-pin connector at header marked IRIS E.T. (rev. C board) or DIM EOT (rev. D board).
   2. Brightness/focus bulkhead six-pin connector at header marked DIM IRIS (rev. C board) or DIM (rev. D board).
   3. Brightness/focus bulkhead six-pin connector at header marked LENS.
   4. Color filter bulkhead two-pin connector at header marked O.T. (rev. C board) or BOT (rev. D board).
   5. Color filter bulkhead four-pin connector at header marked W1 E.T. (rev. C board) or in area marked WH1 (rev. D board).
   6. Color filter bulkhead four-pin connector at header marked W2 E.T. (rev. C board) or in area marked WH2 (rev. D board).
   7. Color filter bulkhead six-pin connector at header marked W1 (rev. C board) or WH1 (rev. D board).
   8. Color filter bulkhead six-pin connector at header marked W2 (rev. C board) or WH2 (rev. D board).

9. Gobo/beam projector four-pin connector at header marked GOBO E.T. (rev. C board) or in area marked GOBO (rev. D board).
10. Gobo/beam projector six-pin connector at header marked GOBO.
11. Gobo/beam projector eight-pin connector at header marked BEAM SIZE (rev. C board) or BEAM (rev. D board).
12. Tilt mechanism four-pin connector at header marked TILT (rev. C board) or in area marked TILT (rev. D board).
13. Tilt mechanism five-pin connector at header marked TILT ENC. (rev. C board) or TILT (rev. D board).

Step 4. Remove color filter bulkhead assembly. Refer to paragraph 3-11.

Step 5. Remove brightness/focus bulkhead assembly. Refer to Brightness/Focus Bulkhead Removal and Replacement paragraph.

Step 6. Remove gobo/beam projector assembly. Refer to Gobo/Beam Projector Removal and Replacement paragraph.

Step 7. Remove lamp assembly from luminaire head.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door (**Figure 3-18**).

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

d. At cable side rail cover, remove 6-32x3/8"PPZ screw and #6 flat washer that secures lamp assembly safety tether to cable side rail cover and remove lamp assembly. Temporarily re-install screw and washer in cable side rail cover.

Step 8. Remove lamp from lamp carriage.

a. At lamp carriage, squeeze and lift lamp retainer.

b. Grasp bulb at porcelain base and remove bulb from lamp carriage.

Step 9. Remove reflector assembly.

a. At reflector assembly, remove three 6-32x5/16"PPZ screws that secure reflector assembly to luminaire head and remove reflector assembly (**Figure 3-19**).

Step 10. Remove iris baffle assembly and front aperture plate (**Figure 3-23**).

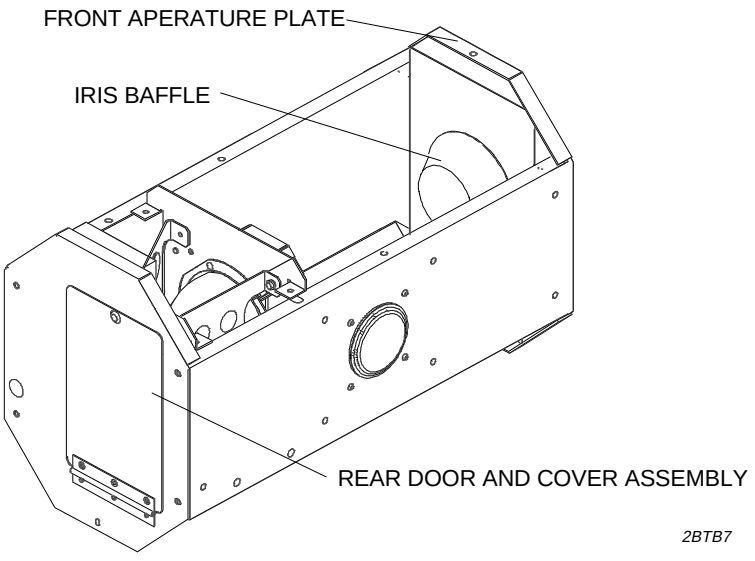


Figure 3-23. Iris Baffle Assembly and Front Aperture Plate Removal and Replacement

a. At front aperture plate, remove four 6-32x5/16"PPB screws that secure plate to side rails and remove front aperture plate.

b. At iris baffle, remove two 6-32x5/16"PPB screws that secure iris baffle to side rails and remove iris baffle.

Step 11. Remove cable side rail cover.

a. At cable side rail cover, remove three 6-32x5/16"PPB screws that secure cover to side rail.

b. Remove one 6-32 KEPS nut that secures tie wrap saddle holding yoke cables to cable side rail and remove saddle from threaded standoff.

c. Using diagonal cutters, cut tie wrap holding cable to saddle.

d. Using 5/16 inch nut driver, remove ground wire ring terminal from threaded standoff.

Step 12. Open chassis lid and remove fan housing.

a. At chassis lid, remove four 4mm x 10mm PPB screws that secure fan with fan housing.

b. At chassis lid, remove six 6-32x5/16"PPB screws that secure lid to chassis and open lid.

c. At fan housing, remove 14, 4-40x5/16"PFB screws that secure cover and remove housing.

d. Allow fan to hang free.

Step 13. Remove yoke cables from luminaire.

a. Cut off tie wraps from cables coming from motherboard, saddle in motherboard card cage, and tie wrap saddle located on pan/fan housing.

b. At motherboard, disconnect yoke cable 24- and 26-position connectors from headers.

c. Remove two 4-40x3/8"PPZ screws that secure yoke cable grommet plate to bottom left of pan/fan housing and remove black grommets from plate.

d. Remove 6-32 KEPS nut holding ground wire to fan housing.

e. Pull out yoke cables and ground wire from fan housing end, not cable side rail.

Step 14. Install replacement yoke cable assembly.

a. At replacement cable assembly, tape yoke cables and ground wire together.

b. To strengthen cable end, tape very long tie wrap or luminaire safety cable to end of yoke cable and ground wire.

c. Place yoke 180° (opposite side) from pan stop.

d. Insert tie wrap or safety cable into pan tube, routing tie wrap through yoke arm on cable side until it is visible in tilt tube (cable side of yoke arm can be identified by groove on tilt tube)
(**Figure 3-24**).

e. Pull tie wrap or safety cable through tilt tube and pull out yoke cables and ground wire. Ensure cables are fully pulled through and there is no slack on pan shaft collar side.

f. Remove tape and tie wrap from yoke cables and ground wire.

g. Maneuver yoke cables on cable side of yoke so that springs on yoke cable are halfway inside tilt tube (**Figure 3-25**). Ensure that cables are not twisted when yoke is at center of rotation.

h. Dress cables as shown in figure 3-25 and secure with tie wrap.

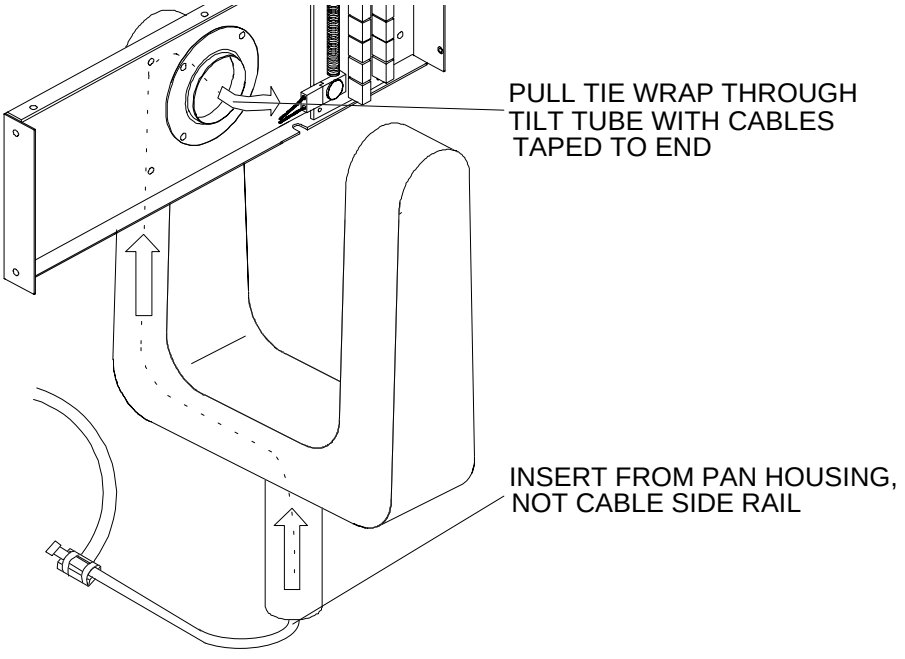


Figure 3-24. Yoke Cable Assembly Replacement

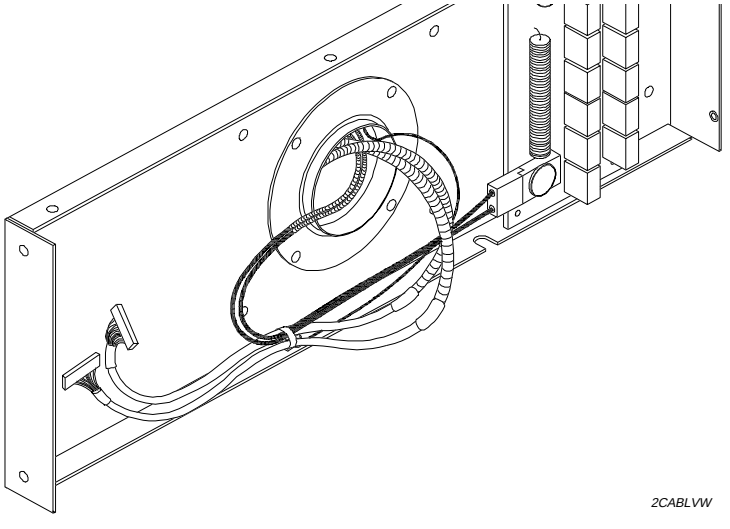


Figure 3-25. Yoke Cable Assembly Dressing

Step 15. Complete yoke cable assembly replacement and re-assemble luminaire by doing Steps 2 through 12 in reverse.

3.3.7 Yoke Removal and Replacement

Parts:

1 EA ASSY, VL2 YOKE (22.9620.0064)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Screwdriver, Standard Flat
Wrench, Allen, 7/64 inch, T-handle
Wrench, Allen, 5/32 inch
Nut driver, 5/16 inch
Diagonal cutters
Loctite 242
Tie wraps, medium
Tape
Permanent black marker
Hook and pick tool
Spacers, two, 0.06 inch(or two medium size tie wraps)

Note: This is a lengthy and involved procedure. Do not attempt if you are not comfortable with maintenance procedures for this luminaire.

To remove and replace yoke assembly:

Step 1. Remove both head covers and electronics chassis lid screws. Remove head assemblies. Remove CFB, BFB, GBP, lamp lamp socket assembly, reflector asembly, cable side and pulley side inner siderails and tilt cover. Refer to Yoke Cable Assembly Removal and Replacement procedure.

Step 2. Remove iris baffle. Remove front aperture plate and rear door and cover assembly.

Step 3. Loosen tilt belt tension and remove tilt pulley. Refer to Tilt/Pan Mechanism Maintenance.

Step 4. Remove outer side rail from tilt side of yoke.

Step 5. Using 5/16 inch nut driver, disconnect ground wire from cable side outer side rail. Refer to Yoke Cable Assembly Removal and Replacement procedure.

Step 6. Using flat screwdriver, remove retaining ring from cable side yoke flange.

Step 7. Remove cable side outer side rail from yoke.

Step 8. Open electronics chassis lid.

Step 9. Remove fan housing. Refer to Yoke Cable Assembly Removal and Replacement procedure.

Step 10. At electronics chassis, pull yoke cables, high-votage lamp wires and ground wire through yoke. Wiring may remain attached within electronics chassis.

Step 11. Using 5/32 inch Allen wrench, loosen hex screw on yoke collar and remove from yoke tube.

Step 12. Loosen pan belt tension to free belt from pulley.

Step 13. Using, 7/64 inch T-handle Allen wrench, loosen four 4-40x7/16”SCB screws on pan driven pulley. Use hole in pan/fan housing to reach screws (turn yoke as necessary).

Note: On some older models, pan/fan housing may not have access hole. Access hole may be created by replacing yoke collar and drilling approximately 1/4 to 3/8 inch hole in pan/fan housing next to outer edge of yoke collar location.

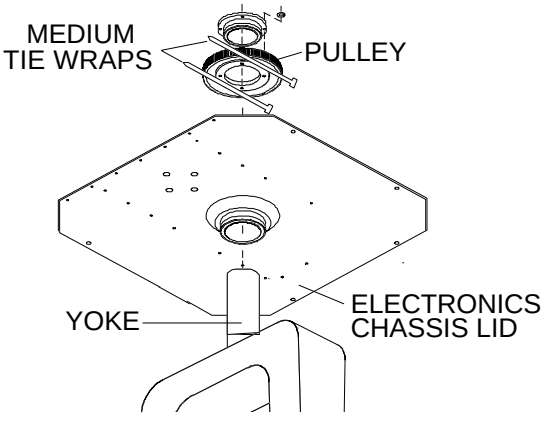
Step 14. Slide yoke assembly free of electronics chassis.

Step 15. Temporarily slide pan pulley onto tube of replacement yoke to verify proper fit. Remove pan pulley. Repeat with yoke collar. Remove.

Step 16. Slide pan tube of replacement yoke through first bearing and into electronics chassis. Install pan pulley and belt and slide yoke pan tube into second bearing.

Step 17. While placing pressure on yoke from below, install pan shaft collar. Make sure yoke pan tube is completely inserted in electronics chassis and tube extends past pan shaft collar slightly. Tighten pan shaft collar with 5/32 inch Allen wrench. Ensure hub clamp of pan shaft collar is firmly set against bearing and there is no vertical movement of yoke pan tube.

Step 18. Place 0.06 inch spacers between pulley and chassis lid. If spacers are not available, two medium size tie wraps can be placed flat on both sides of the pulley (one on each side) to act as temporary spacers.



Step 19. Slide pan belt around pulley and make sure belt is seated properly.

Step 20. Using 7/64 inch T-handle Allen wrench, evenly tighten all 6-32x7/16"SCB screws (in a star pattern) on driven pulley.

Step 21. Remove spacers or tie wraps.

Step 22. Adjust tension of pan mechanism belt. Turn yoke so that pulleys rotate back and forth. At same time, slowly tighten adjustment screw until both tension and feed sides of belt are taut (1/8” deflection desired). Using finger, check deflection of belt when not in motion. Visual observation of belt may not detect over-tightened belt.

Step 23. Re-install yoke cables. Refer to Yoke Cable Assemlby Removal and Replacement.

Step 24. Re-install all mechanisms and assemblies by performing Steps 1 through 9 in reverse order.

3.3.8 ARC Power Supply Ignitor Maintenance

3.3.8.1 APS Ignitor Assembly Removal and Replacement

Parts:

1 EA ASSY, VL2B APS IGNITOR (22.9631.0031)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
diagonal cutters
Tie wrap

To remove and replace APS ignitor assembly:

Step 1. Remove power to luminaire.

Step 2. Remove head covers.

a. Remove 20, 6-32x5/16"PFB screws that secure head covers to rails. Remove both head covers.

Step 3. Disconnect yoke termination board connectors.

a. At yoke termination board (**Figure 3-2**), disconnect the following connectors:
   1. Brightness/focus bulkhead four-pin connector at header marked IRIS E.T. (rev. C board) or DIM EOT (rev. D board).
   2. Brightness/focus bulkhead six-pin connector at header marked DIM IRIS (rev. C board) or DIM (rev. D board).
   3. Brightness/focus bulkhead six-pin connector at header marked LENS.
   4. Color filter bulkhead two-pin connector at header marked O.T. (rev. C board) or BOT (rev. D board).
   5. Color filter bulkhead four-pin connector at header marked W1 E.T. (rev. C board) or in area marked WH1 (rev. D board).
   6. Color filter bulkhead four-pin connector at header marked W2 E.T. (rev. C board) or in area marked WH2 (rev. D board).
   7. Color filter bulkhead six-pin connector at header marked W1 (rev. C board) or WH1 (rev. D board).
   8. Color filter bulkhead six-pin connector at header marked W2 (rev. C board) or WH2 (rev. D board).
   9. Gobo/beam projector four-pin connector at header marked GOBO E.T. (rev. C board) or in area marked GOBO (rev. D board).
   10. Gobo/beam projector six-pin connector at header marked GOBO.
   11. Gobo/beam projector eight-pin connector at header marked BEAM SIZE (rev. C board) or BEAM (rev. D board).
   12. Tilt mechanism four-pin connector at header marked TILT (rev. C board) or in area marked TILT (rev. D board).
   13. Tilt mechanism five-pin connector at header marked TILT ENC. (rev. C board) or TILT (rev. D board).

Step 4. Remove color filter bulkhead assembly. Refer to paragraph 3-11.

Step 5. Remove brightness/focus bulkhead assembly. Refer to Brightness/Focus Bulkhead Removal and Replacement paragraph.

Step 6. Remove gobo/beam projector assembly. Refer to Gobo/Beam Projector Removal and Replacement paragraph.

Step 7. Remove lamp assembly from luminaire.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door (**Figure 3-18**).

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

d. At cable side rail cover, remove 6-32x3/8"PPZ screw and #6 flat washer that secures lamp assembly safety tether to cable side rail cover and remove lamp assembly. Temporarily re-install screw and washer in cable side rail cover.

Step 8. Remove lamp from lamp carriage.

a. At lamp carriage, squeeze and lift lamp retainer.

b. Grasp lamp at porcelain base and remove bulb from lamp carriage.

Step 8. At reflector assembly, remove three 6-32x5/16"PPZ screws that secure reflector assembly to luminaire head and remove reflector assembly (**Figure 3-19**).

Step 10. Remove iris baffle (**Figure 3-23**).

a. At iris baffle, remove two 6-32x5/16"PPB screws that secure iris baffle to side rails and remove iris baffle.

Step 11. Remove cable side rail cover (**Figure 3-26**).

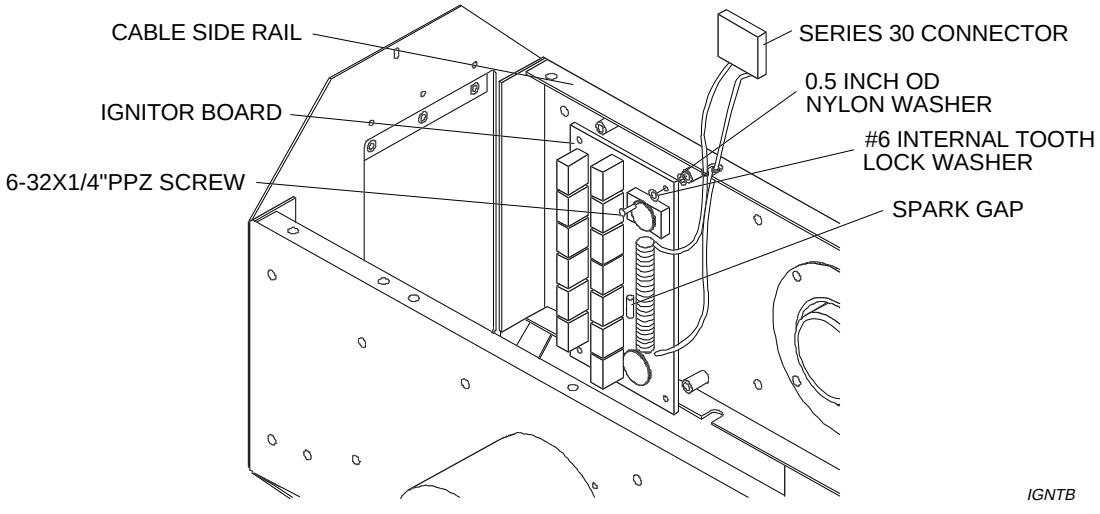


Figure 3-26. APS Ignitor Assembly Removal and Replacement

a. At lamp connector bracket, remove three 4-40x1/4"PPZ screws and KEPS nuts that secure bracket to cable side rail cover. Remove bracket and side rail cover.

b. Using diagonal cutters, cut tie wrap securing high voltage lamp wires and yoke cables to outer side rail. Remove one 6-32x5/16"PPB screw that secures tie wrap saddle holding white high-voltage lamp wires to cable side rail cover and remove saddle.

c. Remove grommets from white high-voltage lamp wires.

Step 12. Remove ignitor board.

a. At ignitor board, remove four 6-32x1/4"PPZ screws, #6 internal tooth lock washers, and 0.5 inch outer diameter nylon washers that secure ignitor board to cable side rail and remove ignitor board.

Step 13. Replace ignitor assembly by doing Steps 2 through 12 in reverse. Nylon washer must be placed between cable side rail standoff and ignitor board assembly.

3.3.8.2 APS Ignitor Assembly Spark Gap Removal and Replacement

Parts:

1 EA SPARK GAP, 2.5KV (75.7102.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Soldering iron

To remove and replace APS ignitor assembly spark gap (Figure 3-26):

Step 1. Remove power to luminaire.

Step 2. Remove ignitor board from luminaire. Refer to APS Ignitor Assembly Removal and Replacement paragraph.

Step 3. At ignitor board spark gap, using soldering iron, remove faulty spark gap and solder replacement spark gap in place.

Step 4. Replace ignitor assembly and re-assemble luminaire. Refer to APS Ignitor Assembly Removal and Replacement paragraph. Nylon washer must be placed between cable side rail standoff and ignitor board assembly.

3.3.9 Yoke Termination Board Removal and Replacement

Parts:

1 EA PCB ASSY, YOKE CBL TERM (VL 2) (24.9621.0085)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

To remove and replace yoke termination board (Figure 3-27):

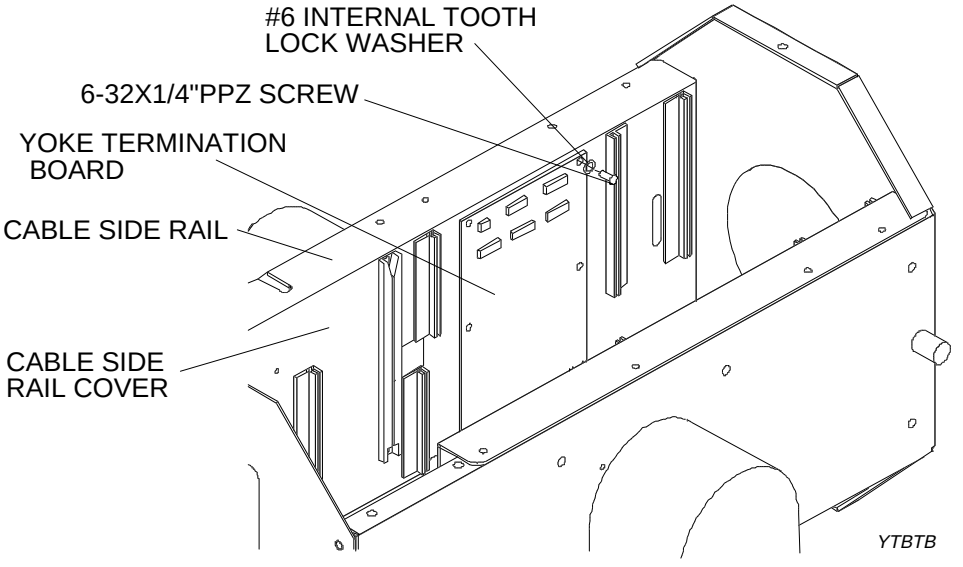


Figure 3-27. Yoke Termination Board Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Remove head covers.

a. Remove 20, 6-32x5/16"PFB screws that secure head covers to rails. Remove both head covers.

Step 3. Disconnect yoke termination board connectors.

a. At yoke termination board (**Figure 3-2**), disconnect the following connectors:

1. Brightness/focus bulkhead four-pin connector at header marked IRIS E.T. (rev. C board) or DIM EOT (rev. D board).

2. Brightness/focus bulkhead six-pin connector at header marked DIM IRIS (rev. C board) or DIM (rev. D board).

3. Brightness/focus bulkhead six-pin connector at header marked LENS.

4. Color filter bulkhead two-pin connector at header marked O.T. (rev. C board) or BOT (rev. D board).
5. Color filter bulkhead four-pin connector at header marked W1 E.T. (rev. C board) or in area marked WH1 (rev. D board).
6. Color filter bulkhead four-pin connector at header marked W2 E.T. (rev. C board) or in area marked WH2 (rev. D board).
7. Color filter bulkhead six-pin connector at header marked W1 (rev. C board) or WH1 (rev. D board).
8. Color filter bulkhead six-pin connector at header marked W2 (rev. C board) or WH2 (rev. D board).
9. Gobo/beam projector four-pin connector at header marked GOBO E.T. (rev. C board) or in area marked GOBO (rev. D board).
10. Gobo/beam projector six-pin connector at header marked GOBO.
11. Gobo/beam projector eight-pin connector at header marked BEAM SIZE (rev. C board) or BEAM (rev. D board).

Step 4. Remove color filter bulkhead assembly. Refer to Color Filter Bulkhead Removal and Replacement paragraph.

Step 5. Remove brightness/focus bulkhead assembly. Refer to Brightness/Focus Bulkhead Removal and Replacement paragraph.

Step 6. Remove yoke termination board.

a. At edges of yoke termination board, remove six 6-32x1/4"PPZ screws and #6 internal tooth lock washers that secure board to cable side rail cover. Do not remove 4-40 screws in middle of board.

b. Disconnect 24- and 26-pin connectors from back of yoke termination board and remove board.

Step 7. Replace yoke termination board by doing Steps 2 through 6 in reverse. When replacing yoke termination board, orient board so that DIM IRIS (rev. C board) or DIM (rev. D board) and IRIS ET (rev. C board) or DIM EOT (rev. D board) markings are closest to iris baffle.

3.3.10 Transformer Assembly Removal and Replacement

Parts:

1 EA ASSY, TRANSFORMER (22.1009.0001)

Tools:

Screwdriver, Phillips #2
Wrench, 11/32 inch, open end

To remove and replace transformer assembly (Figure 3-28):

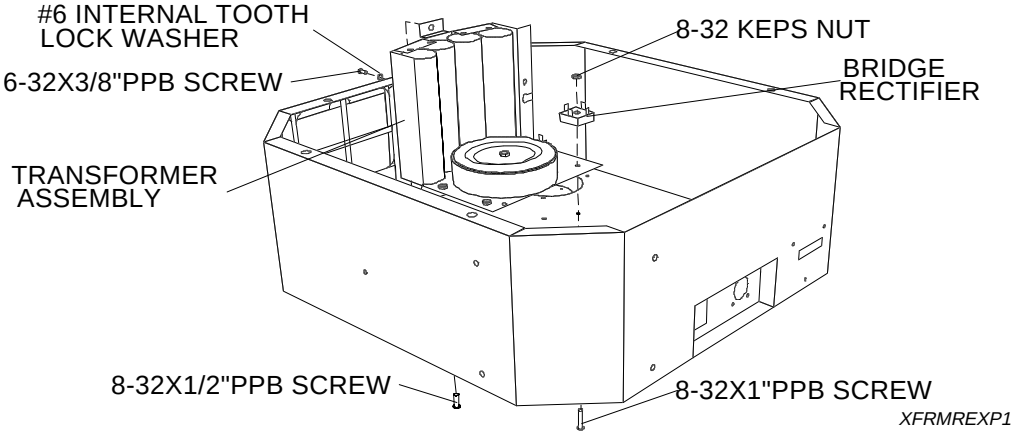


Figure 3-28. Transformer Assembly Removal and Replacement

WARNING: Stored charge in capacitors can cause electrical shock. Care should be taken when power is applied to luminaire and for 10 minutes after removing power from the luminaire. Always use caution when working near capacitors.

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Disconnect transformer connectors.

a. At electronics chassis, remove Arc Power Supply. Refer to maintenance paragraph **Arc Power Supply Maintenance**.

b. At voltage selector board, disconnect nine-position MATE-N-LOK connector.

c. At card cage, remove low voltage supply board.

d. At card cage motherboard, disconnect six-position MATE-N-LOK connector.

e. VL2C only. At DC/DC PCB, remove 4 pin MTA connector.

Step 4. Remove transformer assembly from chassis bottom.

a. At top of transformer bracket, using #2 Phillips screwdriver, from outside of chassis, remove one 6-32x3/8"PPB screw and #6 internal tooth lockwasher from mounting hole.

b. At each bridge rectifier, from bottom of chassis, remove one 8-32x1"PPB screw and 8-32 KEPS nut that secure bridge rectifiers and transformer bracket to chassis bottom.

c. At transformer bracket, from bottom of chassis, remove remaining two 8-32x1/2"PPB screws that secure bracket to chassis bottom.

d. Remove transformer assembly from chassis bottom.

Step 5. Replace transformer assembly by doing Steps 2 through 4 in reverse.

3.3.11 Control Interface Board (CIB), Low Voltage Supply (LVS), Lamp Control Board (LCB) Removal and Replacement

Parts:

1 EA PCB ASSY, LOW VOLTAGE SUPPLY (24.9620.0019)

1 EA PCB ASSY, CIB MODIFIED FOR UPGRADE (24.9620.0021) **FOR VL2B**

1 EA PCB ASSY, CIB MODIFIED FOR UPGRADE (24.9637.0050) **FOR VL2C**

1 EA PCB ASSY, LCB COMBO W/UPGRADE (23.9620.0013) **FOR VL2B**

1 EA PCB ASSY, LCB UPGRADE W/ALL PARTS 24.9620.0301) **FOR VL2C**

Tools:

Screwdriver, Phillips #2

To remove and replace CIB, LVS, or LCB PCB:

Step 1. Remove power to luminaire.

Step 2. At electronics chassis, remove six 10-32x3/8”PPB screws securing chassis lid to chassis and open chassis lid.

Step 3. Remove desired PCB by gently pulling and sliding board up and away from motherboard.

Step 4. Replace desired board by reversing Steps 1 thru 3 above.

3.3.12 Motherboard Removal and Replacement

Parts:

1 EA PCB ASSY, MOTHER BOARD (24.9620.0024)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Screwdriver, Slotted #1

To remove and replace motherboard:

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove card cage PCBs (**Figure 3-29**).

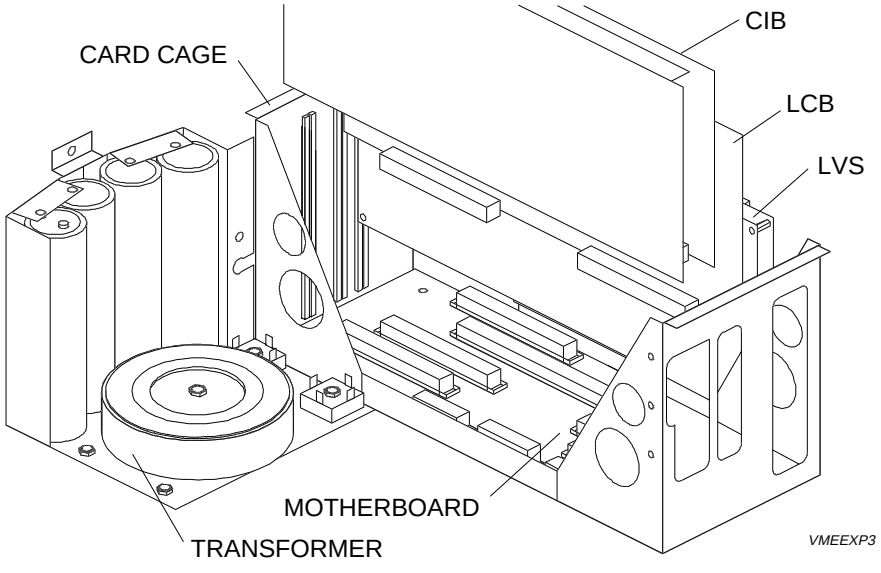


Figure 3-29. Location of Card Cage PCB Assemblies

a. At card cage assembly, gently pull and slide out low voltage supply board

b. Gently pull and slide out control interface board.

c. Gently pull and slide out lamp control board.

Step 4. Remove motherboard from card cage.

a. At motherboard connector headers, disconnect all connectors.

b. At card guides adjacent to transformer assembly and opposite hour meter, using slotted screwdriver, gently pry off and remove card guides (**Figure 3-30**).

c. At each connector header on motherboard, remove two 4-40x5/16"PPZ screws that secure motherboard to card cage and remove motherboard. (There are a total of 22 screws that will be removed.)

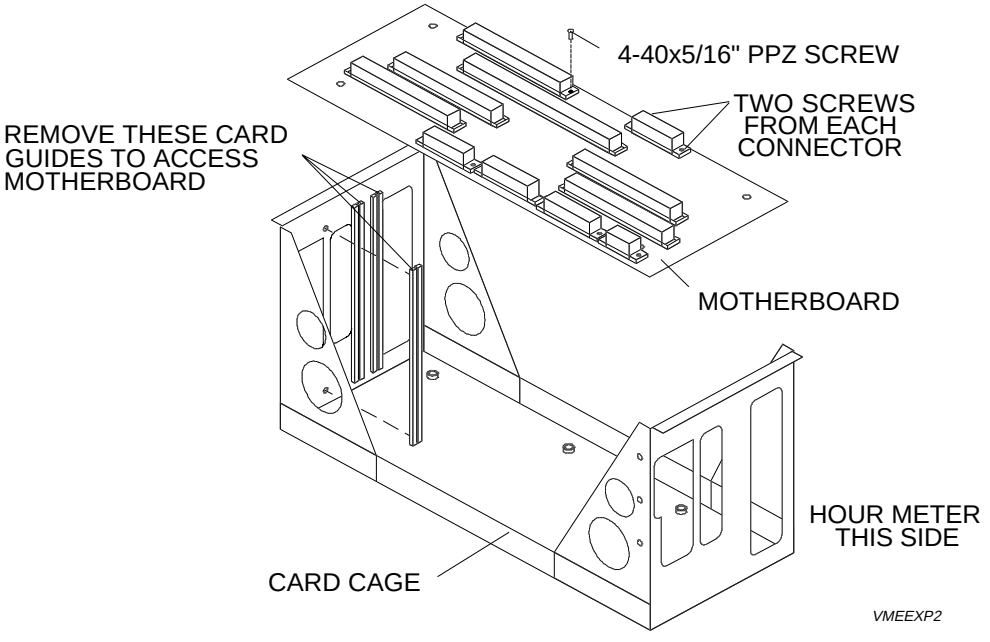


Figure 3-30. Motherboard Removal and Replacement

Step 5. Replace motherboard by doing Steps 2 through 4 in reverse.

3.3.13 Voltage Selector Board Removal and Replacement

Parts:

1 EA PCB ASSY, AC VOLTAGE SELECTOR (VSB)
(24.9620.0077)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

To remove and replace voltage selector board (Figure 3-31):

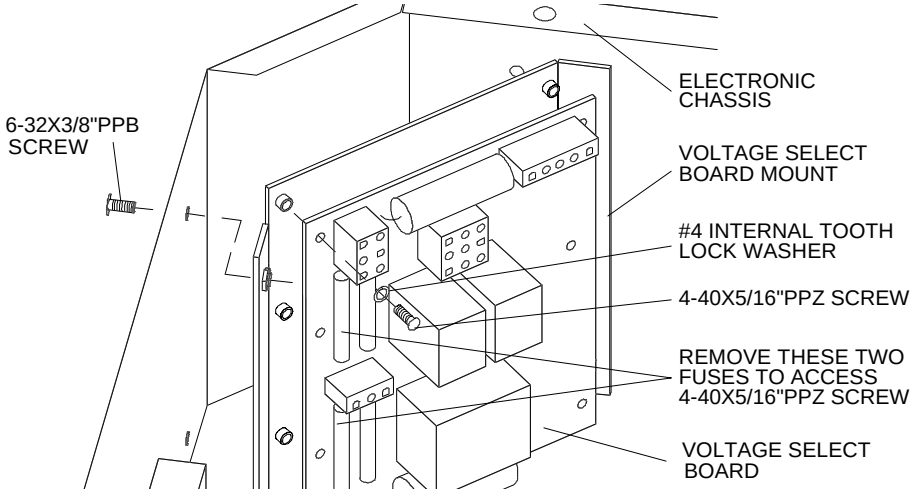


Figure 3-31. Voltage Selector Board Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove voltage selector board.

a. At voltage selector board, disconnect all connectors.

b. From outside of chassis, remove four 6-32x3/8"PPB screws that secure board mount to chassis and remove board and mount from chassis.

c. Remove 15A or 10A and 3A fuses closest to 4-40x5/16"PPZ screws securing board to mount.

d. Remove eight 4-40x5/16"PPZ screws and #4 internal tooth lock washers that secure board to mount and remove board.

Step 4. Replace voltage selector board by doing Steps 2 and 3 in reverse. Verify that board is correctly oriented in mount.

3.3.14 Voltage Selector Board Fuses Removal and Replacement

Parts:

1 EA FUSE, 3A 250V, .25X1.25", SLO-BLO (70.3702.0001)

1 EA FUSE, 15A, 250V, 3AB, FAST CERAMIC .25X1.25" (70.3750.0015)

Tools:

none

To remove and replace voltage selector board fuses. (Figure 3-32):

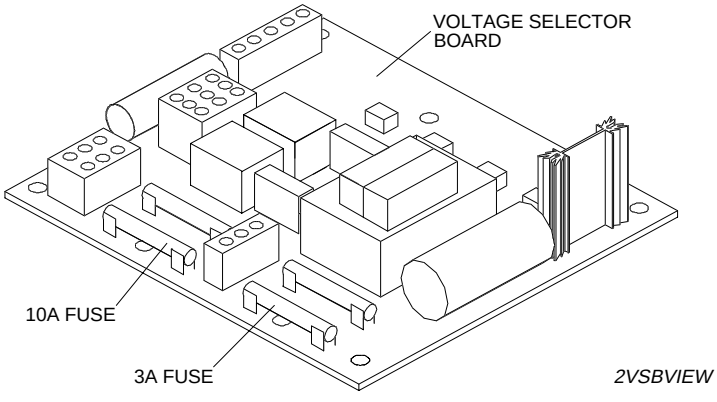


Figure 3-32. Voltage Selector Board Fuses Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove blown fuse.

Note: VL2B luminaire voltage selector boards using 10A fuses are being changed over to 15A fuses. When 10A fuses blow, replace both 10A fuses with 15A fuses. All **VL2C** luminaire voltage selector boards should currently contain 15A fuses.

Step 4. Replace with good fuse and secure chassis lid with six 10-32x3/8”PPB screws.

3.3.15 Card Cage Assembly PCB Removal and Replacement

Parts:

1 EA PCB ASSY, LOW VOLTAGE SUPPLY (LVS) (**VL2B/VL2C**) (24.9620.0019)

1 EA PCB ASSY, CONTROL INTERFACE (CIB) (**VL2B**) (24.9620.0021)

1 EA PCB ASSY, VL2 CIB MODIFIED FOR UPGRADE (**VL2C**) (24.9637.0050)

1 EA ASSY, VL2 LCB W.MEMORY & MODEM (**VL2B**) (21.9620.0013)

1 EA ELEC.ASSY, VL2 LCB COMBO W/UPGRADE BD (**VL2C**) (23.9637.0009)

Tools:

Screwdriver, Phillips #2

To remove and replace card cage assembly PCB (Figure 3-29):

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. At card cage assembly, carefully pull and slide out PCB.

Step 4. To replace card cage assembly PCB, do Steps 2 and 3 in reverse. Ensure that board connectors are firmly seated in motherboard.

3.3.16 Control Interface Board SN75436NE IC Driver Chip Removal and Replacement

Parts:

1 EA IC, 75436 QUAD PERIPHERAL DRIVER (85.5107.0001)

Tools:

Screwdriver, Phillips #2
Screwdriver, Phillips #1

To remove and replace control interface board SN75436NE IC drive chip:

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove control interface card.

a. At card cage assembly, carefully pull and slide out control interface board (**Figure 3-29**).

Step 4. Carefully remove SN75436NE IC from control interface board (**Figure 3-33**).

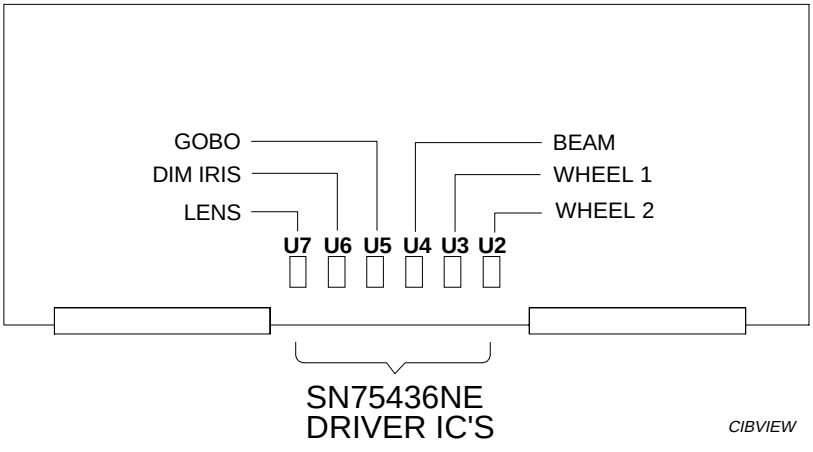


Figure 3-33. SN75436NE IC Driver Chips Removal and Replacement

Step 5. Replace SN75436NE IC by doing Steps 2 through 4 in reverse.

3.3.17 Arc Power Supply Maintenance

3.3.17.1 Arc Power Supply Removal and Replacement

Parts:

1 EA ASSY, ARC POWER SUPPLY 400W (400 watt) (**VL2B**) (22.1006.0002)

1 EA ASSY, ARC POWER SUPPLY 400X (400 watts) (**VL2B**) (22.1006.1002)

1 EA ASSY, VL2C APS 600W (23.9637.0008)

Tools:

Screwdriver, Phillips #2

Notes:

- APS units 400X and 400W are interchangeable, but their parts are not. Do not try to exchange control or switch boards between 400X and 400W APS units.
- APS 400W units are to be retrofitted into APS 400X units. As 400W units fail, they should be returned for shop retrofit.

To remove and replace arc power supply (Figure 3-34):

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove APS power supply.

a. At APS power supply, disconnect all connectors.

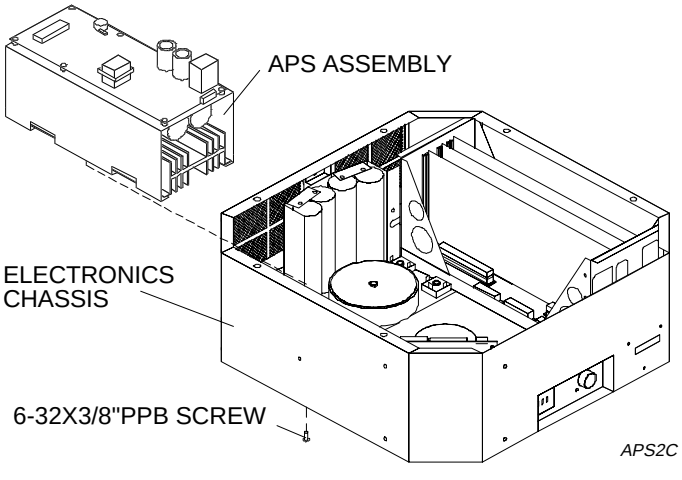


Figure 3-34. Arc Power Supply Removal and Replacement

b. From bottom of chassis, using #2 Phillips screwdriver, remove 10-32x3/8"PPB screws that secure power supply to chassis and remove power supply.

Note: On some units, an additional screw may be found securing APS to side of Electronics Chassis. This screw will need to be removed also.

Step 4. Replace power supply by doing Steps 2 and 3 in reverse.

3.3.17.2 APS Switch Board Rectifier and Diode Removal and Replacement

Parts:

1 EA DIODE, ZENER TS, 1.5KE200 200V 5W (82.5301.0303)

1 EA RECTIFIER, SILICON CONTROLLED C106 (82.4315.0106)

Tools:

Screwdriver, Phillips #2
Screwdriver, Phillips #1
Soldering iron
Solder sucker
Solder

To remove and replace APS switch board rectifier or diode:

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove APS from chassis. Refer to Arc Power Supply Removal and Replacement paragraph.

Step 4. Gain access to APS switch board.

a. At APS control board, disconnect five-pin MATE-N-LOK connector at P7 (**Figure 3-35**).

b. At APS chassis, disconnect four-pin MATE-N-LOK connector.

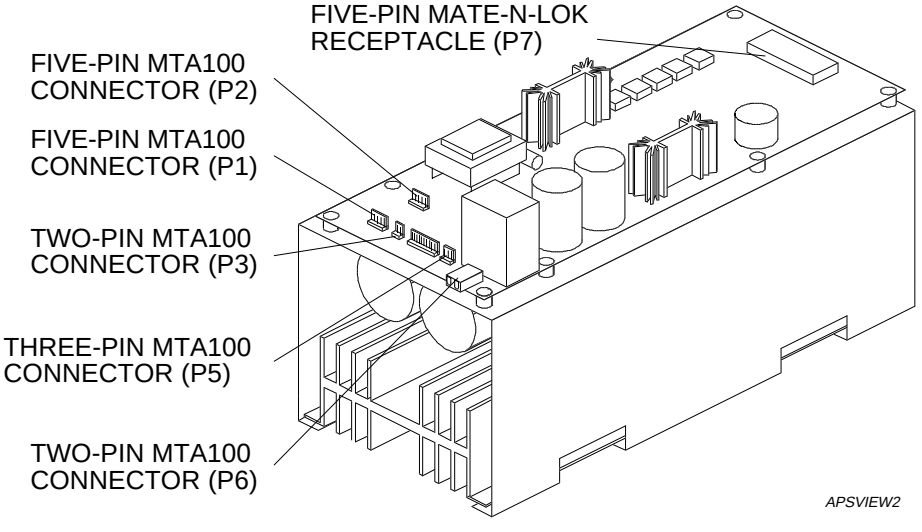


Figure 3-35. Location of APS Switch Board Connectors

c. At APS switch board, disconnect two five-pin MTA connectors at P1 and P2 and one two-pin MTA connector at P3.

d. At base of heat sink assembly, remove four 6-32x5/16"PPZ screws that secure heat sink assembly to APS chassis and slide out heat sink assembly (heat sink assembly can also be gently pried out from sides of APS chassis.

Step 5. Remove rectifier or diode.

a. At APS switch board, locate rectifier or diode to be replaced (**Figure 3-36**).

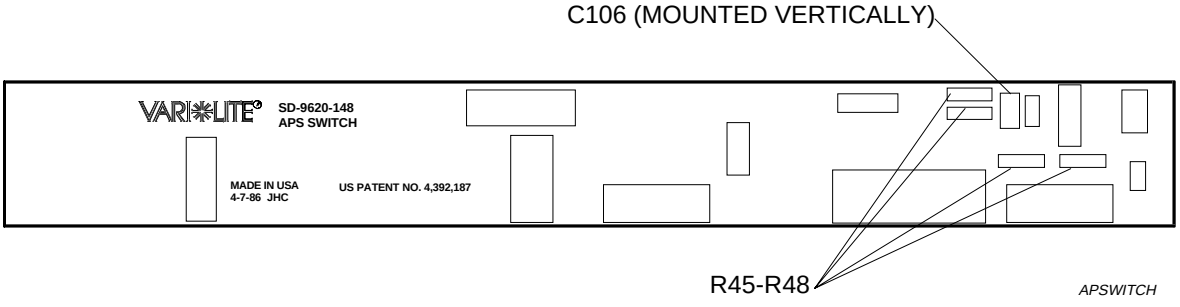


Figure 3-36. Switch Board Resistors and Diodes Removal and Replacement

b. Unsolder faulty rectifier or diode.

Step 6. Replace rectifier or diode by doing Steps 2 through 5 in reverse.

3.3.17.3 APS MJ10005 and IRF450 Transistor Removal and Replacement

Parts:

1 EA TRANSISTOR, MJ10005 NPN 400V 20A TO3 (80.1612.1005)

1 EA TRANSISTOR, IRF450 NCH 500V 10A TO3 (80.1610.0450)

1 EA INSULATOR, TO-3 (51.5005.0001)

Tools:

Screwdriver, Phillips #2

To remove and replace APS MJ10005 transistor or IRF450 FET's:

Notes:

- During VL3 to **VL2B** luminaire upgrade, IRF452 field-effect transistors (FETs) may have been used instead of IRF450 FETs. When replacing IRF452 FET, replace part with IRF450 FET.
- Verify that replacement IRF450 FETs are manufactured by Motorola, GE, or RCA. FETs manufactured by International Rectifiers (IR) should not be used and returned to the shop.

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove APS from chassis. Refer to Arc Power Supply Removal and Replacement paragraph.

Step 4. Separate heat sink from APS.

a. At heat sink assembly (**Figure 3-37**), remove four 6-32x3/8"PPZ screws that secure heat sink assembly to power supply assembly.

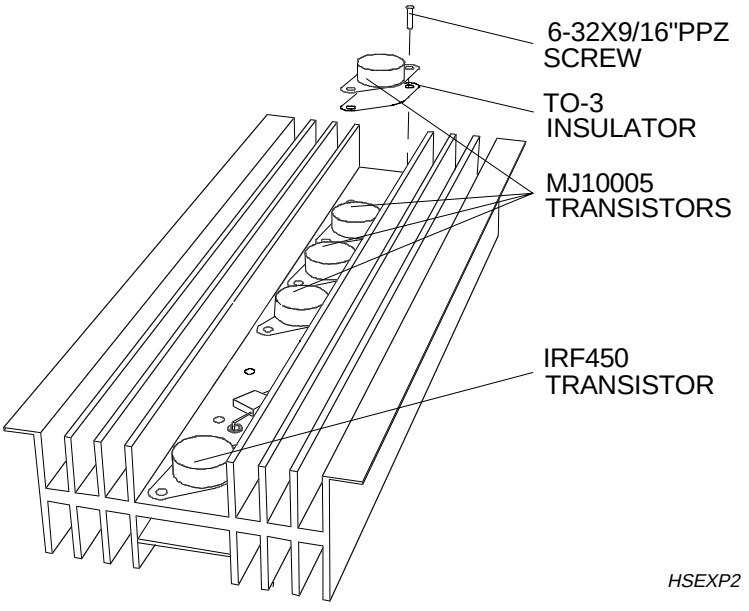


Figure 3-37. APS MJ10005 Transistors and IRF450 FET Removal and Replacement

b. Disconnect FAST-ON receptacles from leads on toroid choke.

c. Disconnect spade terminal from center lead on toroid choke.

d. Disconnect six-pin MATE-N-LOK connector.

e. Slide out heat sink assembly from power supply chassis.

Step 5. Remove transistor or FET.

a. At faulty MJ10005 transistor or IRF450 FET, remove two 6-32x9/16"PFZ screws that secure transistor to heat sink and remove transistor or FET and TO-3 insulator.

Step 6. Install replacement transistor or FET.

a. At rear of replacement transistor or FET, apply new TO-3 insulator.

b. Replace transistor or FET and reassemble luminaire by doing Steps 2 through 5 in reverse.

3.3.17.4 APS Control Board IC, Diode, and Resistor Removal and Replacement

Parts:

1 EA IC, 14024 SEVEN STAGE RIPPLE COUNTER (83.3109.0001)

1 EA DIODE, ZENER, 1N5347 10V 5W (82.5305.5347)

1 EA RES, 1W 5% 10 OHM MET OXIDE (60.3430.1004)

Tools:

Screwdriver, Phillips #2
Screwdriver, Phillips #1
IC Puller
Soldering iron
Solder sucker
Solder

To remove and replace APS control board IC, diode, or resistor:

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove APS from chassis. Refer to Arc Power Supply Removal and Replacement paragraph.

Step 4. Using IC puller for IC chip removal, gently pry IC from socket. Replace IC by doing Steps 2 and 3 in reverse. For diode or resistor replacement, continue with next step.

Step 5. Separate APS control board from APS.

a. At APS control board, disconnect the following connectors (**Figure 3-35**):
- Five-pin MATE-N-LOK connector at P7.
- Two-pin MATE-N-LOK connector at P6.
- Three-pin MTA connector at P5.
- Two-pin MTA connector at P3.
- Four-pin MTA connector at P2.
- Five-pin MTA connector at P1.

b. At APS control board, remove seven 6-32x1/4"PPZ screws that secure control board to APS chassis and remove control board.

Step 6. At faulty diode or resistor, unsolder faulty part.

Step 7. Replace diode or resistor by doing Steps 2 through 6 in reverse.

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3.3.18 Input/Output Connector Removal and Replacement

Parts:

1 EA RECEPT, 9POS CHASSIS MNT LAMP (52.6251.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Pin removal tool
1/4” nut driver

To remove and replace input/output connector, (Figure 3-38):

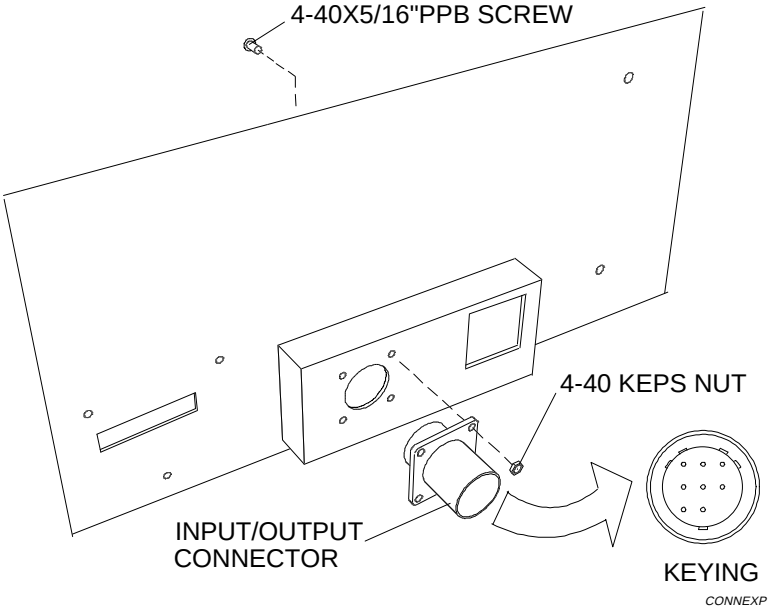


Figure 3-38. Input/Output Connector Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove input/output connector nine-pin receptacle from chassis.

a. At connector, at outside of chassis, using #1 Phillips screwdriver and 1/4” nut driver, remove four 4-40x5/16"PPB screws and 4-40 KEPS nuts that secure square flange receptacle (I/O connector) to chassis.

b. Using pin removal tool, remove pin contacts from faulty receptacle and remove receptacle.

Step 4. Replace receptacle and re-assemble luminaire.

a. At replacement receptacle, insert five gold pins crimped to 22 AWG wires and three pin contacts crimped to 18 AWG wires using the following pinouts:

Pin	Wire	From
1	Open	-
2	Red (22 AWG)	Thumbwheel switch
3	Shield (22 AWG)	Thumbwheel switch
4	Black (22 AWG)	Thumbwheel switch
5	Green (22 AWG)	Thumbwheel switch
6	White (22 AWG)	Thumbwheel switch
7	White (18 AWG)	Voltage selector board
8	Green (18 AWG)	Voltage selector board
9	Black (18 AWG)	Voltage selector board

b. Replace receptacle by doing Steps 2 and 3 in reverse.

3.3.19 Thumbwheel Switch Assembly Removal and Replacement

Parts:

1 EA CABLE ASSY, THUMBWHEEL SWITCH (25.7020.0001)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Pin removal tool

To remove and replace thumbwheel switch assembly (Figure 3-39):

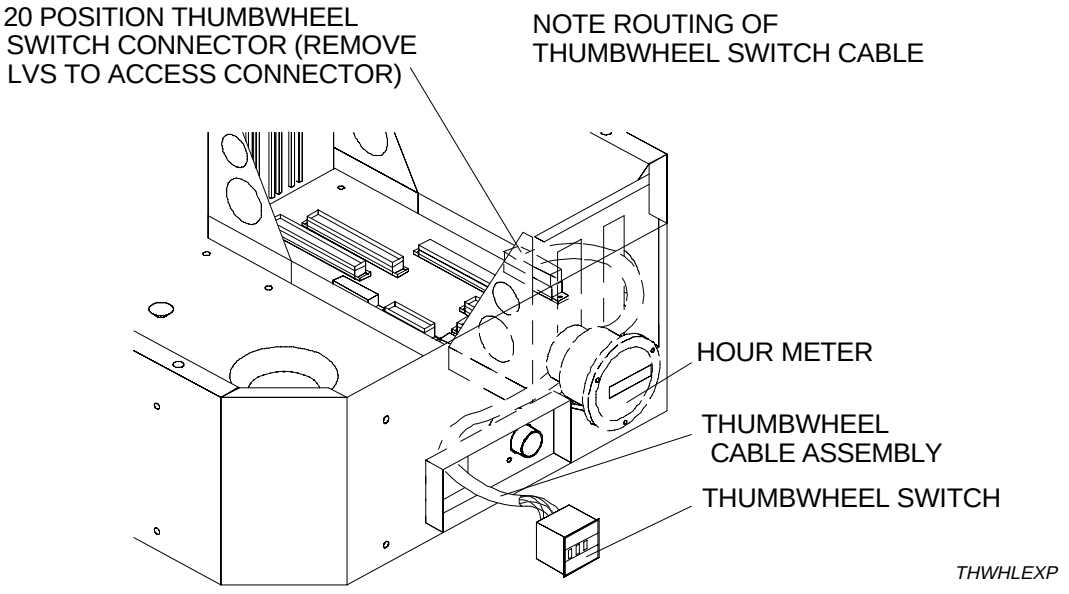


Figure 3-39. Thumbwheel Switch Removal and Replacement

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove low voltage supply board.

a. At card cage assembly, carefully pull and slide out low voltage supply board.

Step 4. At motherboard, disconnect 20-position thumbwheel switch connector.

Step 5. At input connector, at outside of chassis, using pin removal tool, remove five gold pin contacts (positions 2 thru 6) crimped to 22AWG wires from faulty receptacle.

Step 6. Remove thumbwheel switch.

a. At thumbwheel switch, while pushing in on switch retainers, push switch out towards outside of chassis.

Step 7. Replace thumbwheel switch by doing Steps 2 through 6 in reverse.

3.3.20 *VL2C* Fan Drive Plus PCB Removal and Replacement

Parts:

1 EA PCB ASSY, FAN DRIVE PLUS, VL2C (24.9623.0161)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

To remove and replace *VL2C* fan drive plus PCB, (Figure 3-40):

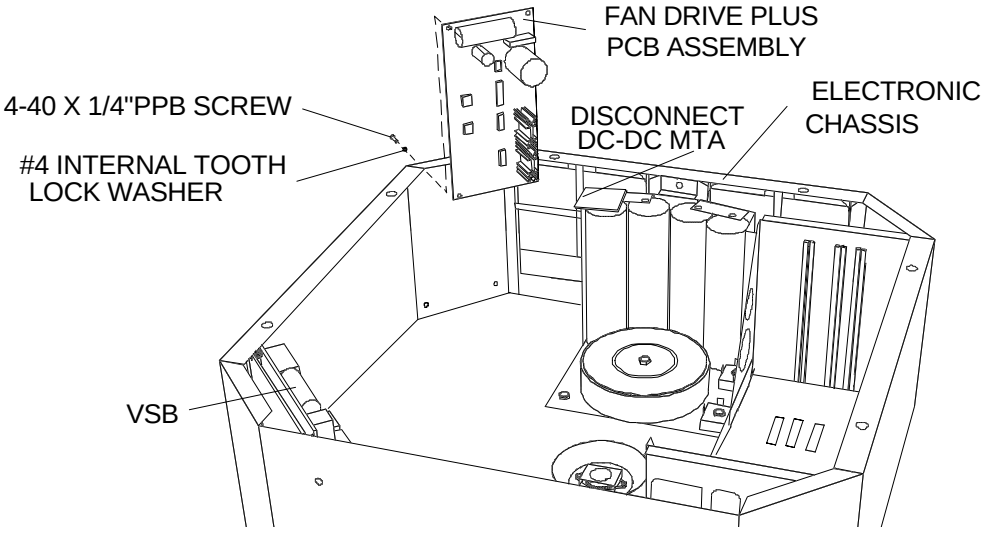


Figure 3-40. *VL2C* Fan Drive Plus Board Removal and Replacement

WARNING: Stored charge in capacitors can cause electrical shock. Care should be taken when power is applied to luminaire and for 10 minutes after removing power from the luminaire. Always use caution when working near capacitors.

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open chassis lid.

Step 3. Remove APS from chassis. Refer to Arc Power Supply Removal and Replacement paragraph.

Step 4. Disconnect MTA connector from DC-DC PCB.

Step 5. Remove fan drive plus board.

a. At Voltage Selector Board and Fan Harness, disconnect two MATE-N-LOK connectors.

b. At DC/DC PCB, disconnect 4 pin MTA connector.

c. From outside of chassis, remove four 4-40x1/4"PPB screws and #4 internal tooth lock washers that secure board to chassis and remove board.

Step 6. Replace fan drive plus board by doing Steps 2 through 6 in reverse.

3.3.21 *VL2C* DC-to-DC Converter PCB Removal and Replacement

Parts:

1 EA PCB ASSY, DC- DC CONVERTER (24.9623.0194)

Tools:

Screwdriver, Phillips #2
Nut driver, 3/8 inch

To remove and replace *VL2C* luminaire DC-to-DC converter PCB, (Figure 3-41):

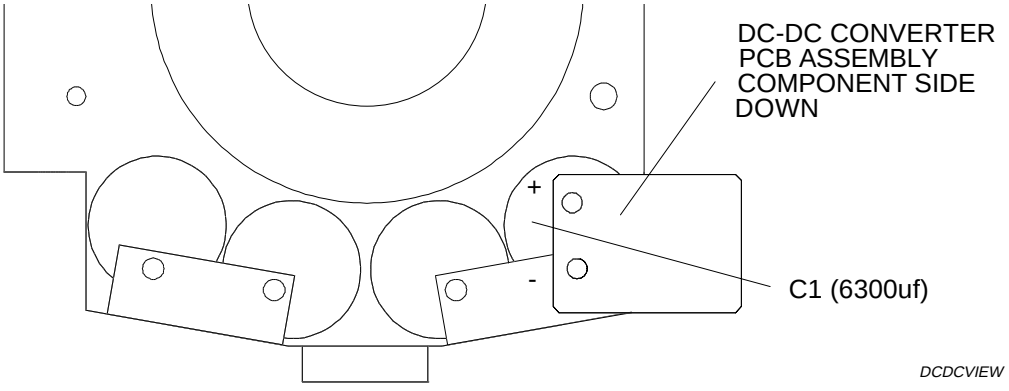


Figure 3-41. *VL2C* Luminaire DC-to-DC Converter PCB Removal and Replacement

WARNING: Stored charge in capacitors can cause electrical shock. Care should be taken when power is applied to luminaire and for 10 minutes after removing power from the luminaire. Always use caution when working near capacitors.

Step 1. Remove power to luminaire.

Step 2. Open chassis lid.

a. At electronics chassis, remove six 10-32x3/8"PPB screws that secure chassis lid to chassis and open lid.

Step 3. Remove DC-to-DC PCB assembly from capacitor terminals.

a. At DC-to-DC PCB, disconnect four-pin MTA100 connector.

b. Using 3/8 inch nut driver, remove two 10-32 KEPS nuts from terminals of capacitor C1 (**Figure 3-42**).

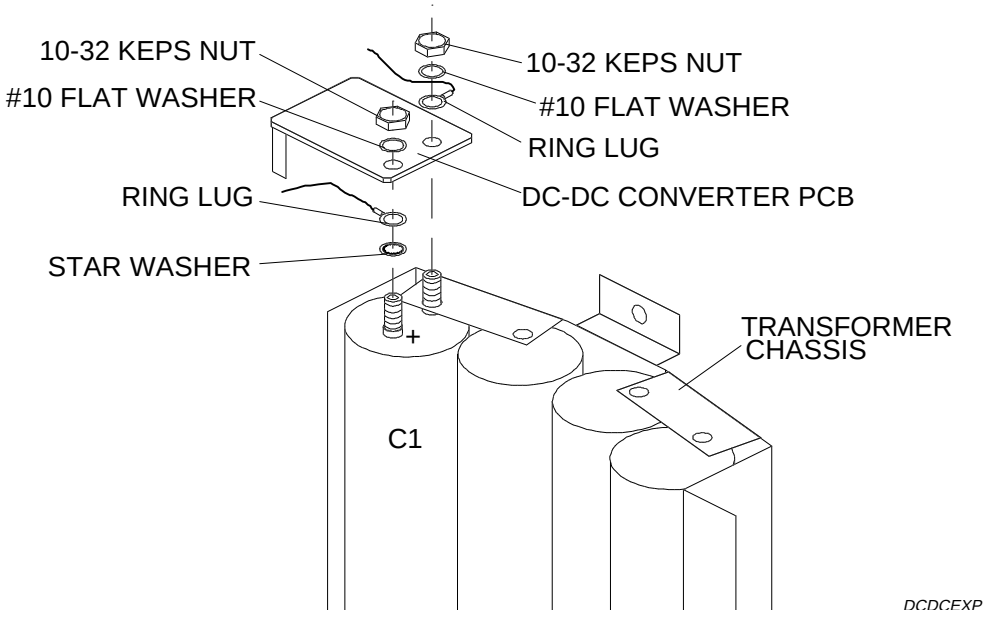


Figure 3-42. Orientation of VL2C Luminaire DC-to-DC Converter PCB Attachment Hardware

c. At negative terminal remove #10 flat washer and ring lug placed on top of PCB assembly.

d. At positive terminal remove #10 flat washer placed on top of PCB assembly.

e. Remove DC-to-DC PCB assembly from capacitor terminals.

Step 4. Replace DC-to-DC PCB by doing Steps 2 and 4 in reverse.

3.3.22 Stuck Truss Hook Removal and Truss Hook Receptacle Removal and Replacement

Note: This procedure requires use of drill, #30 drill bit, and center punch. These items are not in the Test Rack. If these tools are not available, procedure can not be done and luminaire must be returned to shop.

Parts:

1 EA ASSY,FASTENER,TRUSS HOOK (22.9637.0093)

2 EA RIVET, POP 1/8"ODX.313-.375 GR.LENGTH (53.6530.0003)

1 EA NUT, 5/16"-18 STEEL ZINC (53.2025.0001)

2 EA WASHER, 5/16"IDX7/8"OD FLAT STL Z TYPE B (55.6551.0001)

1 EA SCREW, 5/16-18X1"HCSZ GRADE 5 (53.7001.0003)

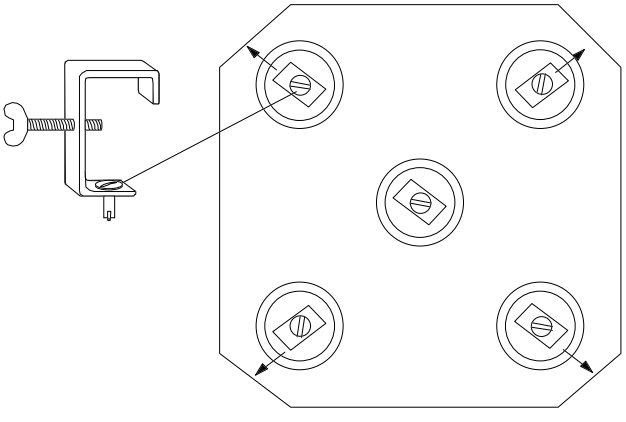
Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Screwdriver, slotted #1
Rivet gun
Drill
Drill bit, #30 (0.1285 inch)
Center punch
Black gaffers tape

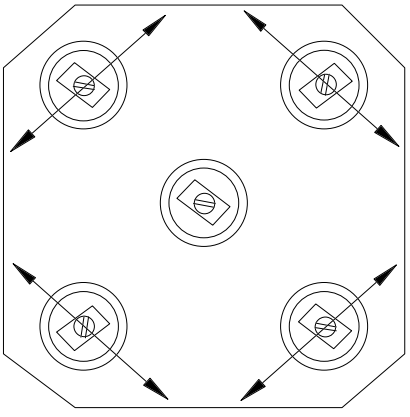
To remove stuck truss hook from luminaire and to remove and replace truss hook fastener:

Step 1. Remove power to luminaire.

Step 2. Turn truss hook so that slot in pin head points toward nearest corner of chassis. This ensures that cross pins in truss hook are aligned with slots that are supposed to be in receptacle.



Step 3. Rock truss hook back and forth in direction parallel to nearest corner of chassis. This allows cross pins in truss hook to bend tabs in receptacle back to allow removal of hook. Push hard on truss hook to make this happen. Tabs in receptacle are bent over and must be bent back into position to allow removal of hook.



Step 4. When tabs are bent back into position, truss hook will come out.

Step 5. Gain access to damaged receptacle.

a. For access to receptacle #1, remove voltage selector board. Refer to Voltage Selector Board Removal and Replacement paragraph. Remove APS. Refer to APS Switch Board Rectifier and Diode Removal and Replacement paragraph.

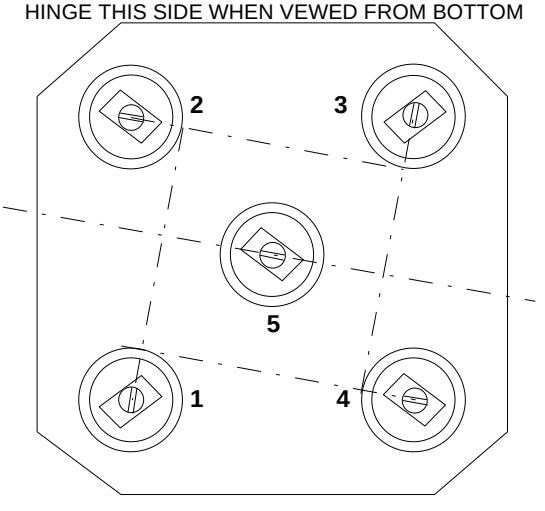


Figure 3-43. Proper Orientation of *VL2B/VL2C* Luminaire Truss Hook Receptacle Slots

b. For access to receptacle #2, remove APS. Refer to APS Removal and Replacement paragraph.

c. For access to receptacle #5, no assembly removal is required.

d. For access to receptacle #3 and receptacle #4, remove card cage assembly by doing the following:

i. Remove all card cage assemblies. Refer to Card Cage Assembly PCB Removal and Replacement paragraph.

WARNING: Stored charge in capacitors can cause electrical shock. Care should be taken when power is applied to luminaire and for 10 minutes after removing power from the luminaire. Always use caution when working near capacitors.

ii. At transformer, at each bridge rectifier, from bottom of chassis, remove one 8-32x1"PPB screw and 8-32 KEPS nut that secure bridge rectifiers and transformer bracket to chassis bottom.

iii. Without disconnecting bridge rectifier spade connectors, move bridge rectifiers away from card cage.

iv. With bridge rectifiers out of way, pivot end of card cage near bridge rectifier towards middle of chassis to release end of card cage from top lip of chassis and move card cage to gain access to receptacle.

Step 6. At bottom of chassis, remove chassis lining covering damaged receptacle.

Step 7. Using center punch, punch center of two rivets that secure damaged receptacle and stop to chassis.

Step 8. Using #30 drill bit and drill, drill out rivets.

Step 9. Remove damaged receptacle and stop.

Step 10. Place replacement truss hook fastener assembly over rivet holes.

Step 11. Place one 5/16" flat washer onto 5/16-18X1"HCSZ screw and insert screw and washer through fastener assembly so that screw head is on outside of chassis (**Figure 3-44**). At other end of screw, install second flat washer on screw and firmly tighten nut onto screw. Screw will hold fastener assembly securely to chassis when installing pop rivets.

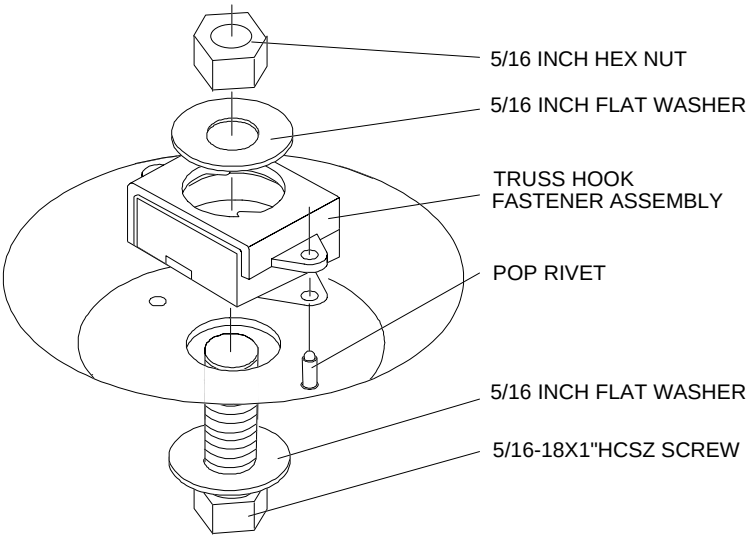


Figure 3-44. Truss Hook Fastener Removal and Replacemen

Step 12. From exterior of chassis bottom, using rivet gun, fasten two rivets through truss hook fastener assembly.

Step 13. Remove 5/16-18X1"HCSZ screw, two 5/16" flat washers and hex nut from fastener.

Step 14. At chassis bottom, where chassis liner was removed, use gaffers tape to cover fastener.

Step 15. Reassemble luminaire by doing Step 6 in reverse.

3.3.23 *VL2C* Reflector/Mirror Assembly Removal and Replacement

Parts:

1 EA ASSY, REFLECTOR/MIRROR (22.9631.0046)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2

To remove ***VL2C*** luminaire reflector/mirror assembly:

Step 1. Remove power to luminaire.

Step 2. Remove gobo side head cover.

a. Remove 10, 6-32x5/16"PFB screws that secure gobo side head cover to rails and remove head cover.

Step 3. At reflector assembly, remove three 6-32x5/16”PPZ screws that secure reflector assembly to side rails (**Figure 3-19**). Remove reflector assembly.

Step 4. Remove lamp assembly from luminaire.

a. At lamp assembly, turn 1/4-turn fastener on rear door and open rear door.

b. Turn two 1/4-turn fasteners on lamp mounting plate to free lamp mounting plate from reflector bulkhead.

c. Carefully slide out lamp assembly from luminaire head.

Step 5. At reflector assembly side brackets, remove four 6-32x3/8”PPZ screws and two 6-32 KEPS nuts that secure side brackets to reflector/mirror assembly and separate assembly from brackets (**Figure 3-45**).

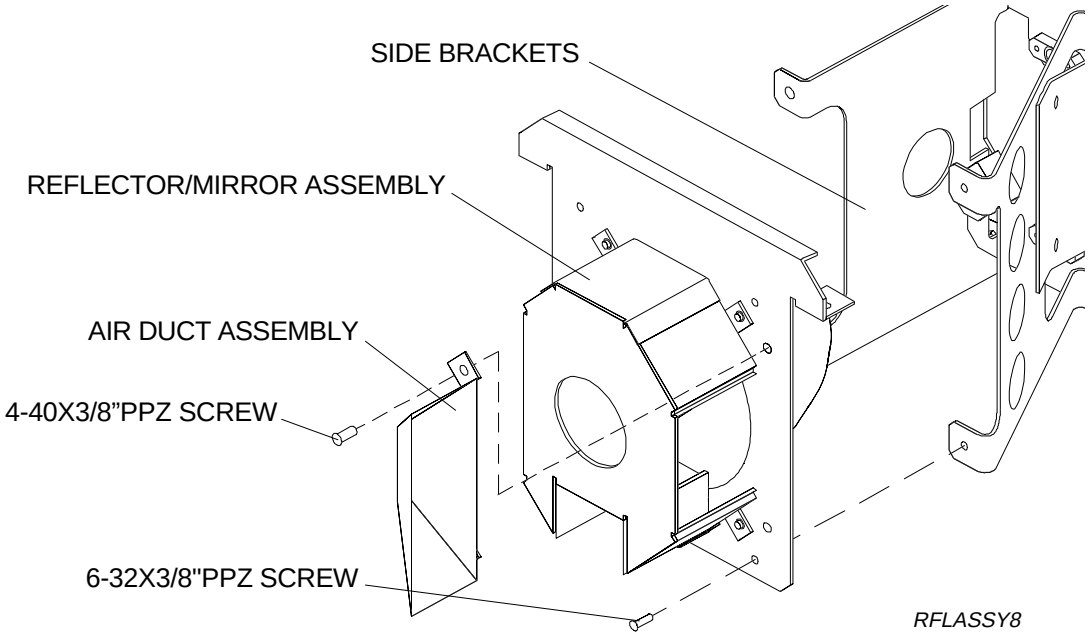


Figure 3-45. *VL2C* Reflector/Mirror Assembly Removal and Replacement

Step 6. At air duct assembly, remove two 4-40x3/8”PPZ screws that secure air duct assembly to reflector/mirror assembly and remove air duct.

Step 7. Replace reflector/mirror assembly by doing Steps 2 through 6 in reverse.

3.3.24 Calibration Procedures

3.3.24.1 Color and Gobo Wheel Sensor Calibration

The end of travel (EOT) sensors on the color and gobo wheels must be set to the proper positions, with the filter wheels turning, to ensure correct operation of the color and gobo changing mechanisms. The sensor, which consists of a lamp and a phototransistor, provides a +15 VDC output when reflected light is detected by the phototransistor and goes to 0 VDC when light is not detected.

The sensor output will normally be +15 VDC, except when the black tape on each wheel is in position to interrupt the sensor's light beam. When the filter wheel spins continuously, the sensor provides a negative-going pulse each time the sensor sees the black tape. The sensor is to be adjusted for the widest pulse width. Ensure that the pulse drops to within +3 VDC of ground.

Parts:

1 EA PROM,(PRGMD:27C256-2) **VL2B** HI TEST (87.7138.0001)

1 EA PROM,(PRGMD:27C256-2) **VL2B** LOW TEST (87.7138.0002)

1 EA PROM, (PRGMD:27C256-2) **VL2C** HI TEST (87.7149.0001)

1 EA PROM, (PRGMD:27C256-2) **VL2C** LO TEST (87.7149.0002)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Wrench, open end, 1/4 inch
Oscilloscope with 10X probe
Lamp run cheater cable

To calibrate color or gobo wheel sensor:

Step 1. Remove power to luminaire.

Step 2. Open electronics chassis.

Step 3. Remove lamp control board from card cage. Refer to Lamp Control Board Removal and Replacement paragraph.

Step 4. Remove EPROMs from lamp control board and install either **VL2B** or **VL2C** luminaire test PROMs. Make sure that HI and LOW PROMs are installed in correct positions.

Step 5. Re-install lamp control board in luminaire.

Step 6. Close, but do not fully secure, chassis lid.

Step 7. Verify that luminaire head covers are removed. If not, remove 20, 6-32x5/16"PFB screws that secure head covers to rails and remove both head covers.

Step 8. Verify that gobo beam projector bulkhead and color filter bulkhead are installed in luminaire head.

Step 9. Connect nine-pin connector end of lamp run cheater cable to luminaire and then plug other end of cable into AC outlet.

Step 10. Set up oscilloscope. See **Figure 3-46** for location of controls and indicators for Tektronix oscilloscope models 2205 and 2225. For other model oscilloscope, locations of controls and indicators are similar to those of these two models. Numbers in parentheses indicate **Figure 3-46** control and indicator reference numbers.

a. Attach 10X probe to CH1 input (7).

b. Position MODE CH 1 BOTH CH 2 switch (3) to CH 1.

c. Position CH 1 AC GND DC switch (6) to GND.

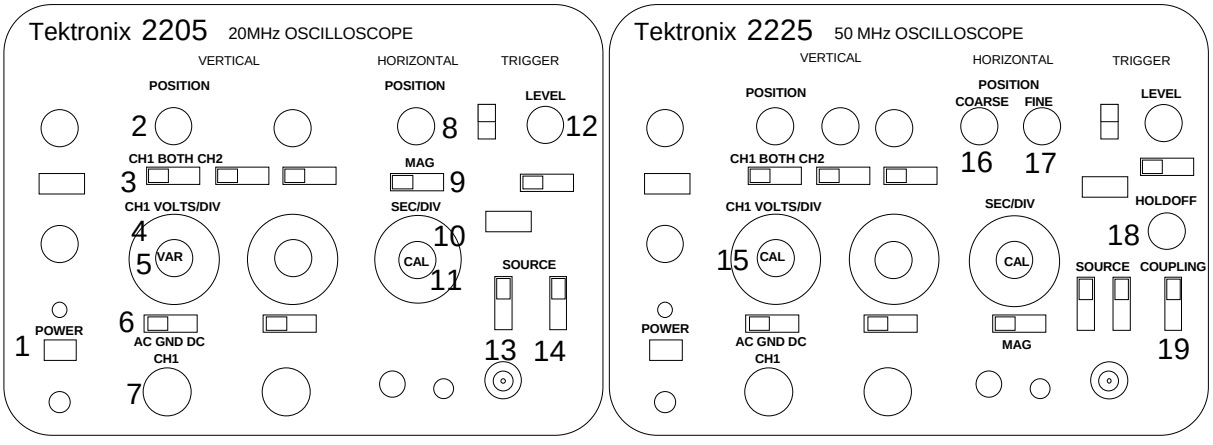


Figure 3-46. Oscilloscope Setup

d. Position CH 1 VOLTS/DIV knob (4) to 5 volts at 10X PROBE scale.

i. For model 2205 oscilloscope turn VAR knob (5) located on CH 1 VOLTS/DIV knob to fully clockwise position.

ii. For model 2225 oscilloscope turn CAL knob (15) located on CH 1 VOLTS/DIV knob to fully clockwise position.

e. Position SEC/DIV knob (10) to 5 ms. Turn CAL knob (11) located on SEC/DIV knob to fully clockwise position.

f. Position MAG switch (9) to X1.

g. Turn LEVEL knob (12) to fully counterclockwise position.

h. For model 2225 oscilloscope model only, turn HOLDOFF knob (18) to fully counterclockwise position.

i. Position left TRIGGER SOURCE switch (13) to CH1.

j. Position right TRIGGER SOURCE switch (14) to LINE.

k. For model 2225 oscilloscope model only, position COUPLING switch (19) to DC.

l. Press in POWER button (1) to apply power. Allow unit to warm up for 5 minutes.

m. Adjust CH1 VERTICAL POSITION knob (2) and align trace to horizontal centerline of display to set zero voltage reference for display.

n. Adjust HORIZONTAL POSITION knob and align trace so that it stretches fully across width of display. For model 2225 oscilloscope, use COARSE adjustment knob (16) first, then use FINE adjustment knob (17).

o. Position CH1 AC GND DC switch (6) to DC.

Step 11. Attach ground clip of oscilloscope probe to luminaire chassis. Make sure that clip is attached to unpainted surface to ensure good ground connection. Zinc screws and most unpainted surfaces are good places to make ground connections.

Step 12. Using oscilloscope 10X probe, at yoke termination board, probe green wire on four-pin MTA connector for wheel to be calibrated:

a. Revision C Yoke Termination Board
   1. W1 E.T. for color wheel 1.
   2. W2 E.T. for color wheel 2.
   3. GOBO E.T. for gobo wheel.

b. Revision D Yoke Termination Board
   1. WH1 for color wheel 1.
   2. WH2 for color wheel 2.
   3. GOBO for gobo wheel.

Step 13. At luminaire thumbwheel switch, set switch to 016 (color wheel continuous cycle test), 017 (color wheel 2 continuous cycle test) or 018 (gobo wheel continuous cycle test), as needed.

Step 14. Loosen sensor.

a. For color wheels, loosen sensor vertical positioning screw holding sensor to bracket.

b. For gobo wheel, loosen nut that holds sensor to mounting bracket.

Step 15. Move sensor toward or away from wheel until widest possible pulse width is obtained. See **Figure 3-47** for view of acceptable sensor pulse waveforms.

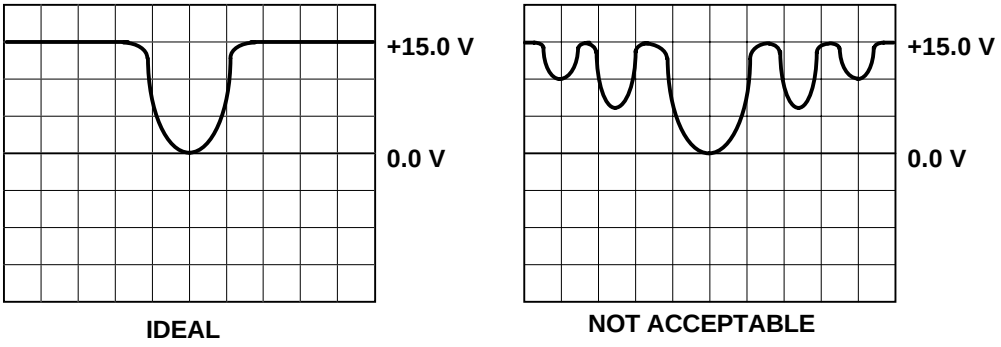


Figure 3-47. Sensor Pulse Waveforms

a. Verify that pulse drops to +3 VDC or lower.

b. For gobo wheel sensor, sensor must remain fairly perpendicular to gobo wheel or light will not bounce back to phototransistor at all.

c. Adjust oscilloscope HOLDOFF knob (only on Tektronix model 2225 oscilloscope) to stabilize waveform if waveform is jumping around on screen.

Step 16. Secure sensor in calibrated position.

Step 17. Disconnect lamp run cheater cable from AC outlet and then disconnect cable from luminaire.

Step 18. Disconnect oscilloscope from luminaire.

Step 1. Remove lamp control board test EPROMs, re-install system EPROMs in lamp control board, and secure chassis lid with six 10-32x3/8"PPB screws.

Step 20. Secure head covers to rails with eight 6-32x5/16"PFB and 12, 6-32x5/16"PPB screws.

3.3.24.2 Control Interface Board Trimpot Calibration

The control interface board contains offset null trimpots for the pan and tilt servo circuits. These must be adjusted properly to eliminate jitter in the pan/tilt mechanisms. Test EPROMs are used to provide zero data to the digital-to-analog converter that drives the pan/tilt mechanism. The trimpots are used to zero the output of the servo driver amplifiers with zero data input. The output of the servo driver located on the low voltage supply board is measured as the trimpots are tweaked.

Parts:

1 EA PROM,(PRGMD:27C256-2) **VL2B** HI TEST (87.7138.0001)

1 EA PROM,(PRGMD:27C256-2) **VL2B** LO TEST (87.7138.0002)

1 EA PROM, (PRGMD:27C256-2) **VL2C** HI TEST (87.7149.0001)

1 EA PROM, (PRGMD:27C256-2) **VL2C** LO TEST (87.7149.0002)

Tools:

Screwdriver, Phillips #1
Screwdriver, Phillips #2
Screwdriver, tweaker
Oscilloscope with 10X probe
Lamp run cheater cable

To calibrate pan/tilt trimpots:

Step 1. Remove power to luminaire.

Step 2. Open electronics chassis

Step 3. Remove lamp control board from card cage. Refer to paragraph 3-27.

Step 4. Remove system EPROMs from lamp control board and install either **VL2B** or **VL2C** luminaire test EPROMs. Make sure that HI and LOW EPROMs are installed in correct positions.

Step 5. Re-install lamp control board in luminaire.

Step 6. Secure upper enclosure lid so that luminaire head and yoke can move freely with lid open. (Clip luminaire safety cable loop to pan stop.)

Caution: Luminaire can become unbalanced and tip over in this position. Exercise caution during this test.

Step 7. At luminaire thumbwheel switch, set switch to 000.

Step 8. Connect nine-pin connector end of lamp run cheater cable to luminaire and then plug other end of cable into AC outlet. Allow luminaire to run for 5 minutes to heat up low voltage supply.

Step 9. Verify that luminaire head and yoke are away from stops.

Step 10. Set up oscilloscope. See **Figure 3-46** for location of controls and indicators for Tektronix oscilloscope models 2205 and 2225. For other model oscilloscope, locations of controls and indicators are similar to those of these two models. Numbers in parentheses indicate **Figure 3-46** control and indicator reference numbers.

a. Attach 10X probe to CH1 input (7).

b. Position MODE CH 1 BOTH CH 2 switch (3) to CH 1.

c. Position CH 1 AC GND DC switch (6) to GND.

d. Position CH 1 VOLTS/DIV knob (4) to 0.5 volts at 10X PROBE scale.
   1. For model 2205 oscilloscope turn VAR knob (5) located on CH 1 VOLTS/DIV knob to fully clockwise position.
   2. For model 2225 oscilloscope turn CAL knob (15) located on CH 1 VOLTS/DIV knob to fully clockwise position.

e. Position SEC/DIV knob (10) to 5 ms. Turn CAL knob (11) located on SEC/DIV knob to fully clockwise position.

f. Position MAG switch (9) to X1.

g. Turn LEVEL knob (12) to fully counterclockwise position.

h. For model 2225 oscilloscope model only, turn HOLDOFF knob (18) to fully counterclockwise position.

i. Position left TRIGGER SOURCE switch (13) to CH1.

j. Position right TRIGGER SOURCE switch (14) to LINE.

k. For model 2225 oscilloscope model only, position COUPLING switch (19) to DC.

l. Press in POWER button (1) to apply power. Allow unit to warm up for 5 minutes.

m. Adjust CH1 VERTICAL POSITION knob (2) and align trace to horizontal centerline of display to set zero voltage reference for display.

n. Adjust HORIZONTAL POSITION knob and align trace so that it stretches fully across width of display. For model 2225 oscilloscope, use COARSE adjustment knob (16) first, then use FINE adjustment knob (17).

o. Position CH1 AC GND DC switch (6) to DC.

Step 11. Attach oscilloscope ground probe to upper enclosure. Make sure that clip is attached to unpainted surface to ensure good ground connection. Zinc screws and most unpainted surfaces are good places to make ground connections.

CAUTION: To prevent electrical shock, be careful to not touch transformer capacitors when probing servo driver amplifiers.

Step 12. Locate tilt transistor on top of low voltage supply (**Figure 3-48**) and tilt trimpot on control interface board (**Figure 3-49**).

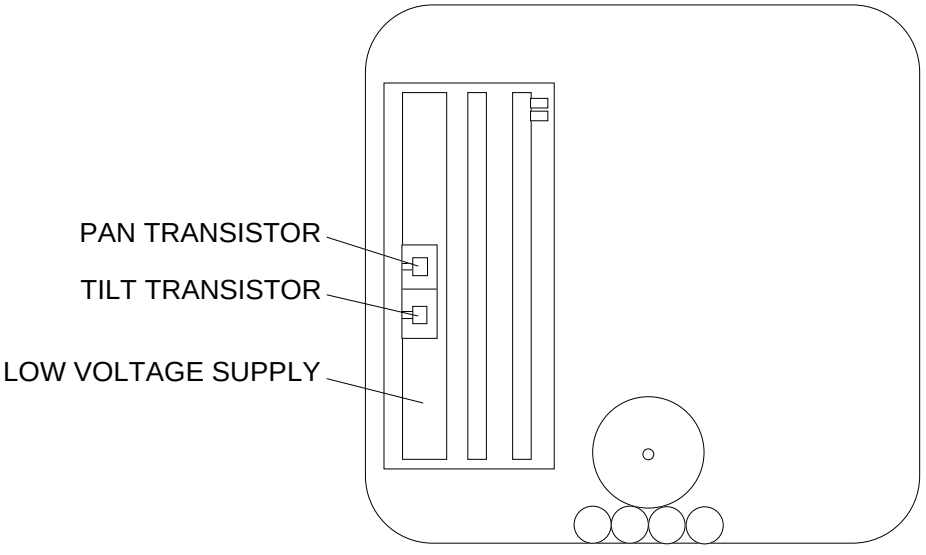


Figure 3-48. Location of Tilt and Pan Transistor

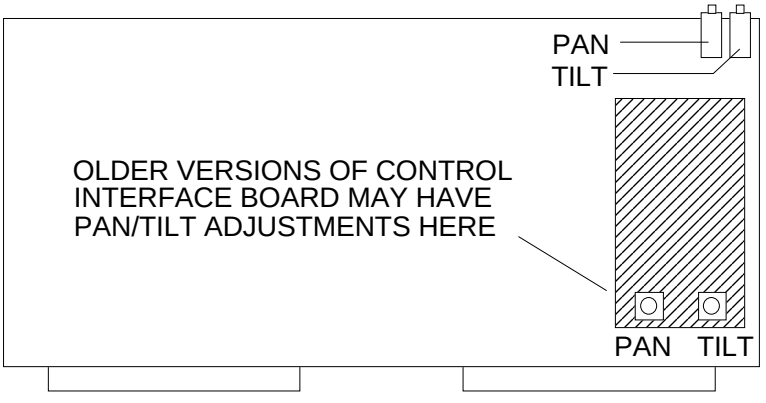


Figure 3-49. Location of Pan and Tilt Trimpots

Notes:

- When adjusting trimpots, do not allow head or yoke to drift into stops.
- Some early versions of control interface boards have one-turn pan and tilt trimpots located on daughterboard. These trimpots have less resolution than 10-turn trimpots used on newer version of board. Adjusting these trimpots requires more time and patience.

Step 13. Using oscilloscope, measure output of pan servo driver amplifier. Screw head securing TO-220 output driver transistor (Q3, Q4) to heatsink serves as testpoint. This is common collector output of servo drive amplifier.

Step 14. Change setting on oscilloscope to 0.1 volt per division for final adjustment.

Step 15. Adjust pan trimpot for stable reading of 0.0 ± 0.1 VDC at servo driver amplifier output. Make adjustment until oscilloscope trace is flat at 0.0 volts.

Step 16. Set thumbwheel to 001 and run pan test for 3 minutes. Then set thumbwheel back to 000 and recheck pan null adjustment.

Step 17. Repeat Steps 10 through 15 for tilt servo driver amplifier. Screw head securing TO-220 output driver transistor (Q7, Q8) to heatsink serves as testpoint. This is common collector output of servo drive amplifier.

Step 18. Set thumbwheel to 002 and run tilt test for 3 minutes. Then set thumbwheel back to 000 and recheck tilt null adjustment.

Step 19. When calibration is complete, disassemble oscilloscope and return luminaire to operation by doing Steps 2 through 9 in reverse.

Chapter 4. Illustrated Parts Breakdown

This chapter contains a complete illustrated parts breakdown for the **VL2B** & **VL2C** Luminaries. All parts are identified by their Vari-Lite part number and name for the purpose of identification and ordering. This chapter is divided into the following sections:

4.1 Drawing Tree: **VL2B** and **VL2C**

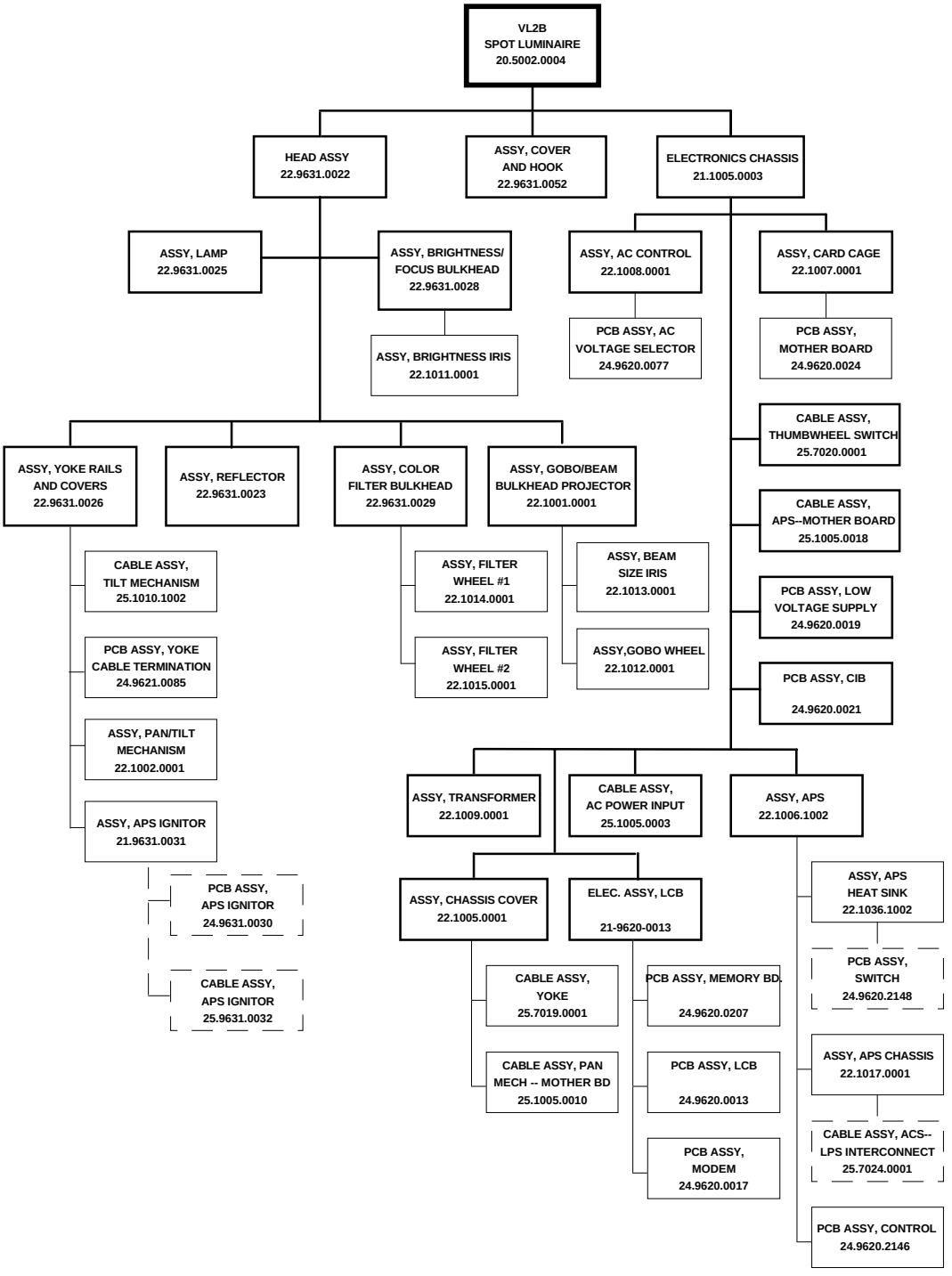
4.2 Illustrated Parts

Note: All parts for each sub-assembly are listed in part number order. Parts are identified on the corresponding illustration by item numbers. If a part is used multiple times in different places, the quantity is noted next to the illustration item number.

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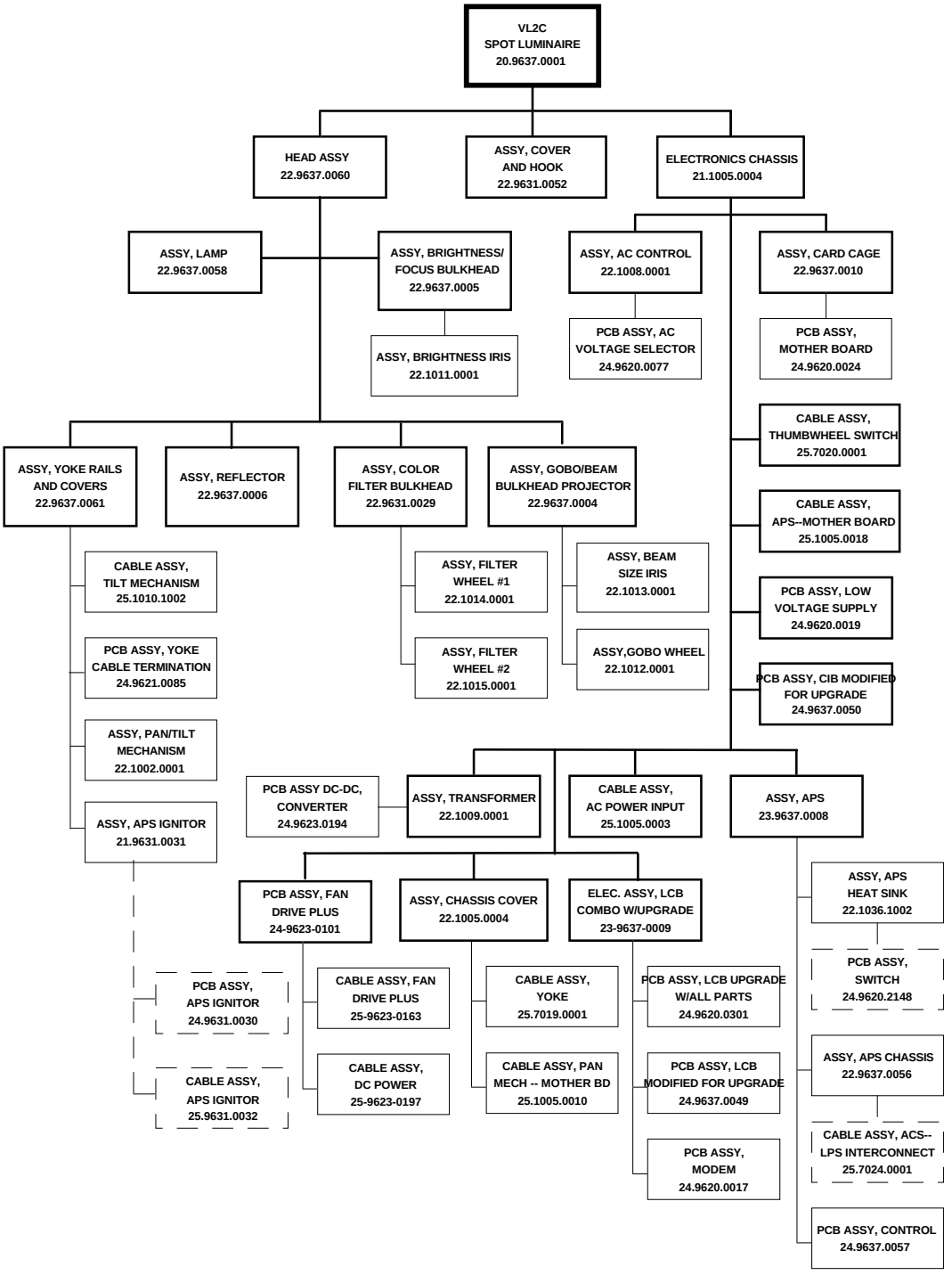
4.1 Drawing Trees

4.1.1 *VL2B* Spot Luminaire (20.5002.0004)



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4.1.2 *VL2C* Spot Luminaire (20.9637.0001)

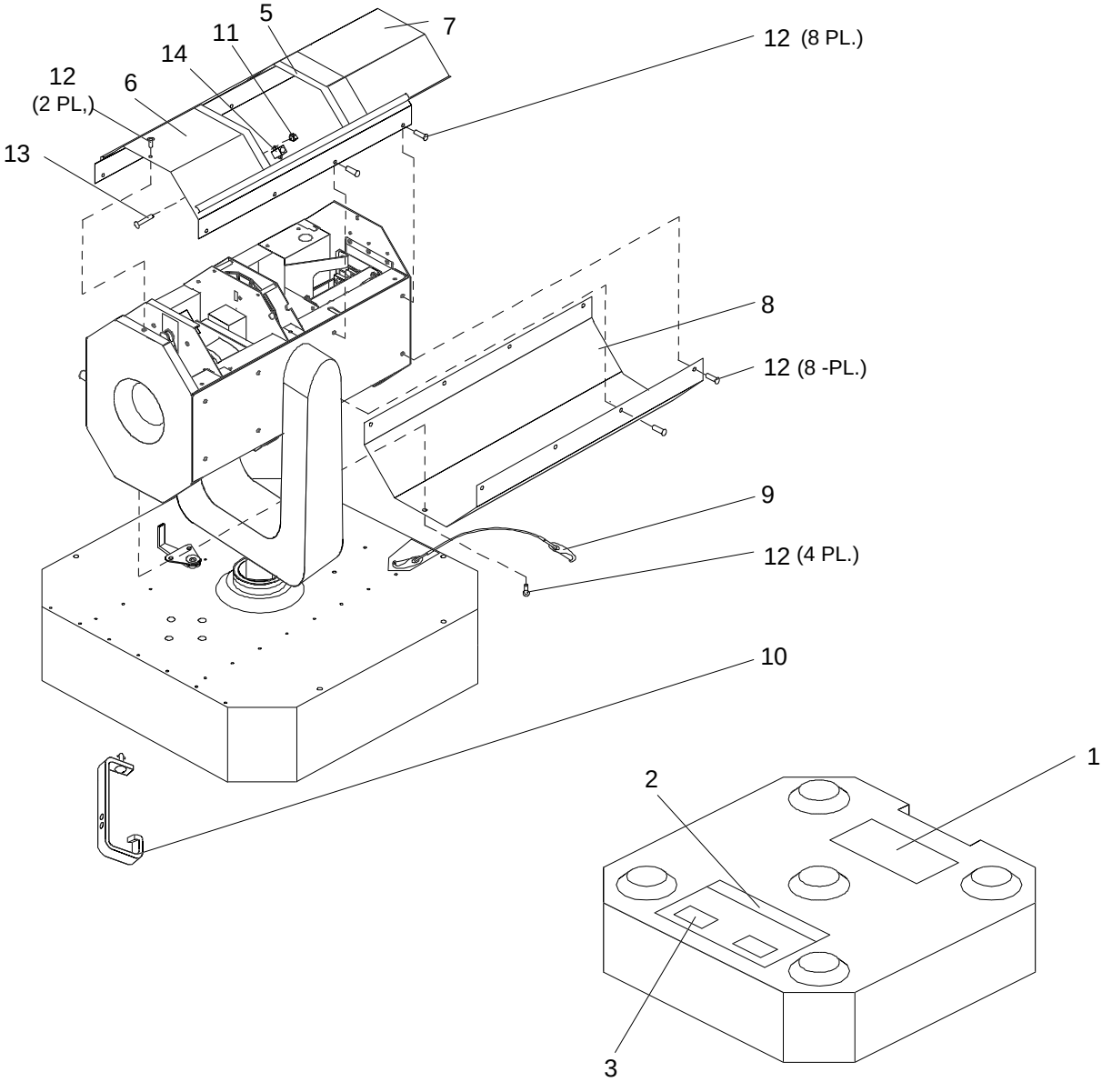


4.2 Parts Breakdown

4.2.1 Assembly, Hooks and Covers 22.9631.0052 (*VL2B*) 22.9637.0068 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	04.3001.0200	1 EA	LABEL, SERIES 200 SYSTEM
2	04.3002.0002	1 EA	LABEL, VL2(B) TRADEMARK STICKER (YELLOW) **(VL2B ONLY)**
	04.3003.0002	1 EA	LABEL, VL2C TRADEMARK STICKER (GREEN) **(VL2C ONLY)**
3	04.4001.0001	1 EA	TAGS, LAMP ID
4	04.9637.0094	1 EA	LABEL, INPUT RATING-VL2C (NOT SHOWN) **(VL2C ONLY)**
5	06.6018.0001	18 IN	VELCRO LOOP, 5/8"BLK ADHESIVE BACKED (**VL2B Only**)
6	10.9621-0091	1 EA	COVER, ACCESS, LAMP/GOBO (**VL2B Only**)
	22.9637.0027	1 EA	HEAD COVER ASSY, VL2C TOP (W/GOBO DOOR) (**VL2C Only**)
	22.9637.0028	1 EA	COVER,HEAD,GOBO,VL2C
	22.9637.0030	1 EA	HINGED ASSY, GOBO, VL2C
	10.9637.0031	1 EA	COVER, SHROUD, GOBO
	22.9637.0032	1 EA	COVER, HINGED, GOBO
7	10.9621.0092	1 EA	COVER, SLIDING (**VL2B Only**)
8	10.9631.0014	1 EA	COVER, HEAD (**VL2B Only**)
	22.9637.0033	1 EA	HEAD COVER ASSY, VL2C BOTTOM (**VL2C Only**)
9	22.9620.0194	1 EA	ASSY, LAMP SAFETY CABLE
10	22.9620.0217	2 EA	ASSY, TRUSS HOOK, 200S
11	53.2003.0001	8 EA	NUT, 4-40 KEP ZINC PLATED (**VL2B Only**)
12	53.6542.0001	20 EA	SCREW, 6-32X5/16"PFB
13	55.2203.0001	8 EA	SCREW, 4-40X1/4"PPZ (**VL2B Only**)
14	55.2219.0001	4 EA	NY LATCH ROLLER CATCH (**VL2B Only**)

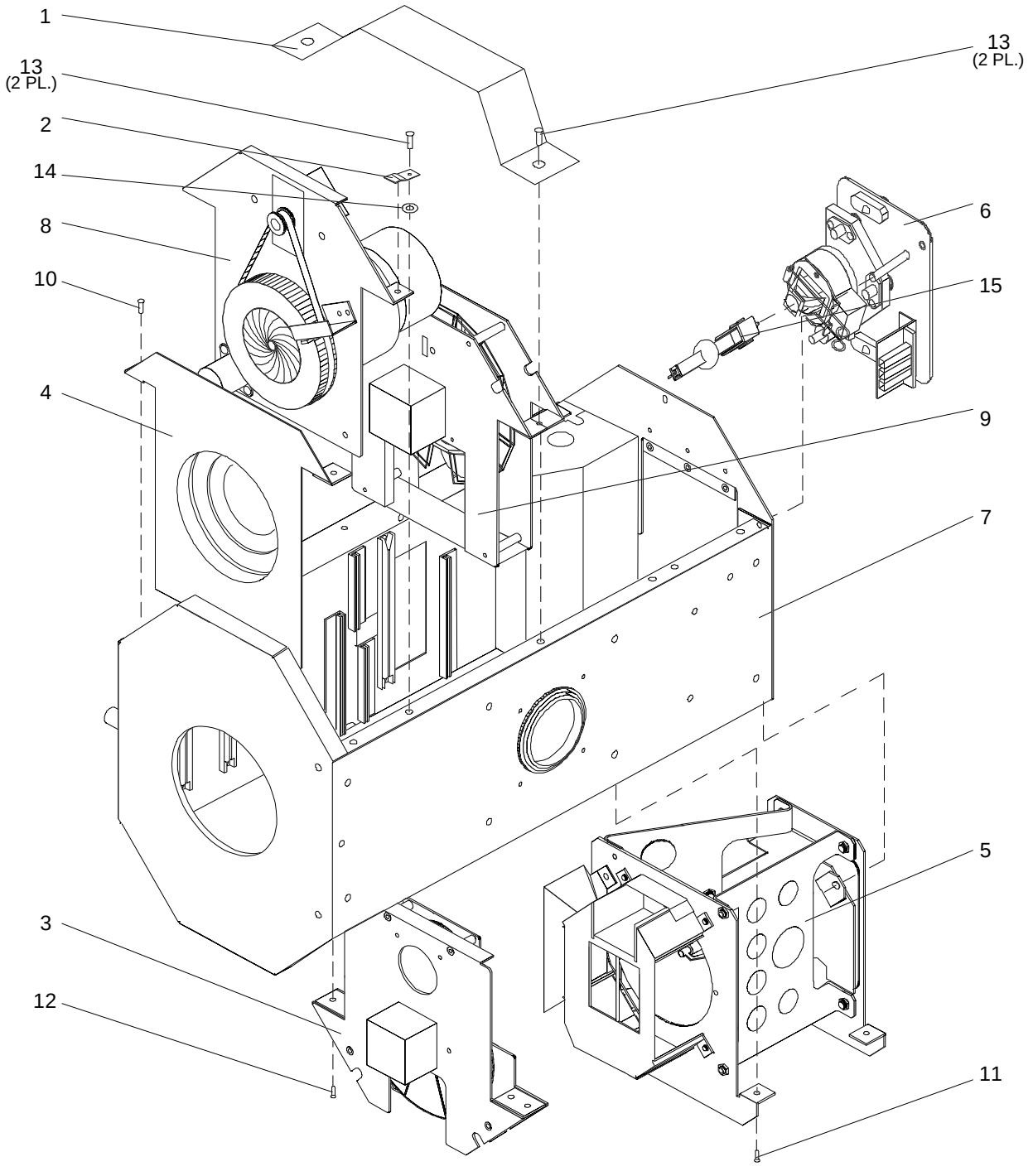
Assembly, Hooks and Covers (continued)
22.9631.0052 (*VL2B*)
22.9637.0068 (*VL2C*)



4.2.2 Assembly, Head 21.9631.0022 (*VL2B*) 21.9637.0060 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9621.0061	1 EA	SHROUD, COLOR WHEEL
2	10.9637.0036	2 EA	ADAPTER, FOCUS BULKHEAD (**VL2C ONLY)**
3	22.1001.0001	1 EA	ASSY, GOBO/BEAM BULKHEAD PROJECTOR (**VL2B Only**)
	22.9637.0004	1 EA	ASSY, VL2C GBP (GOBO/BEAM PROJECTOR) (**VL2C Only**)
4	22.9621.0051	1 EA	ASSY, IRIS BAFFLE
	10.9621.0087	1 EA	FRUSTRUM, IRIS BAFFLE
5	22.9631.0023	1 EA	ASSY, VL2B REFLECTOR (**VL2B Only**)
	22.9637.0006	1 EA	ASSY, VL2C REFLECTOR BULKHEAD (**VL2C Only**)
6	22.9631.0025	1 EA	ASSY, VL2B LAMP (**VL2B Only**)
	22.9637.0058	1 EA	ASSY, VL2C LAMP (**VL2C Only**)
7	22.9631.0026	1 EA	ASSY, VL2B YOKE RAILS & COVERS (**VL2B Only**)
	22.9637.0061	1 EA	ASSY, VL2C YOKE, RAILS & COVERS YRC2C (**VL2C Only**)
8	22.9631.0028	1 EA	ASSY, VL2B BRIGHTNESS/FOCUS BULKHEAD (**VL2B Only**)
	22.9637.0005	1 EA	ASSY, VL2B BFB (BRIGHTNESS/FOCUS BULKHD) (**VL2C Only**)
9	22.9631.0029	1 EA	ASSY, VL2B COLOR FILTER BULKHEAD
10	53.6524.0002	2 EA	SCREW, 6-32X5/16"PPB
11	53.6525.0001	3 EA	SCREW, 6-32X5/16"PPZ
12	53.6543.0001	2 EA	SCREW, 6-32X3/8"PPB
13	53.6558.0001	4 EA	SCREW, 6-32X3/8"PPZ
14	55.6677.0006	2 EA	WASHER, FLAT .434OD X 156ID X .062THK (**VL2B Only**)
15	71.2524.0002	1 EA	LAMP, ARC SNGL ENDED 400W (VL4) (**VL2B Only**)
	71.2527.0001	1 EA	LAMP, HTI 600W S/E (**VL2C ONLY**)

Assembly, Head (continued)
21.9631.0022 (*VL2B*)
21.9637.0060 (*VL2C*)

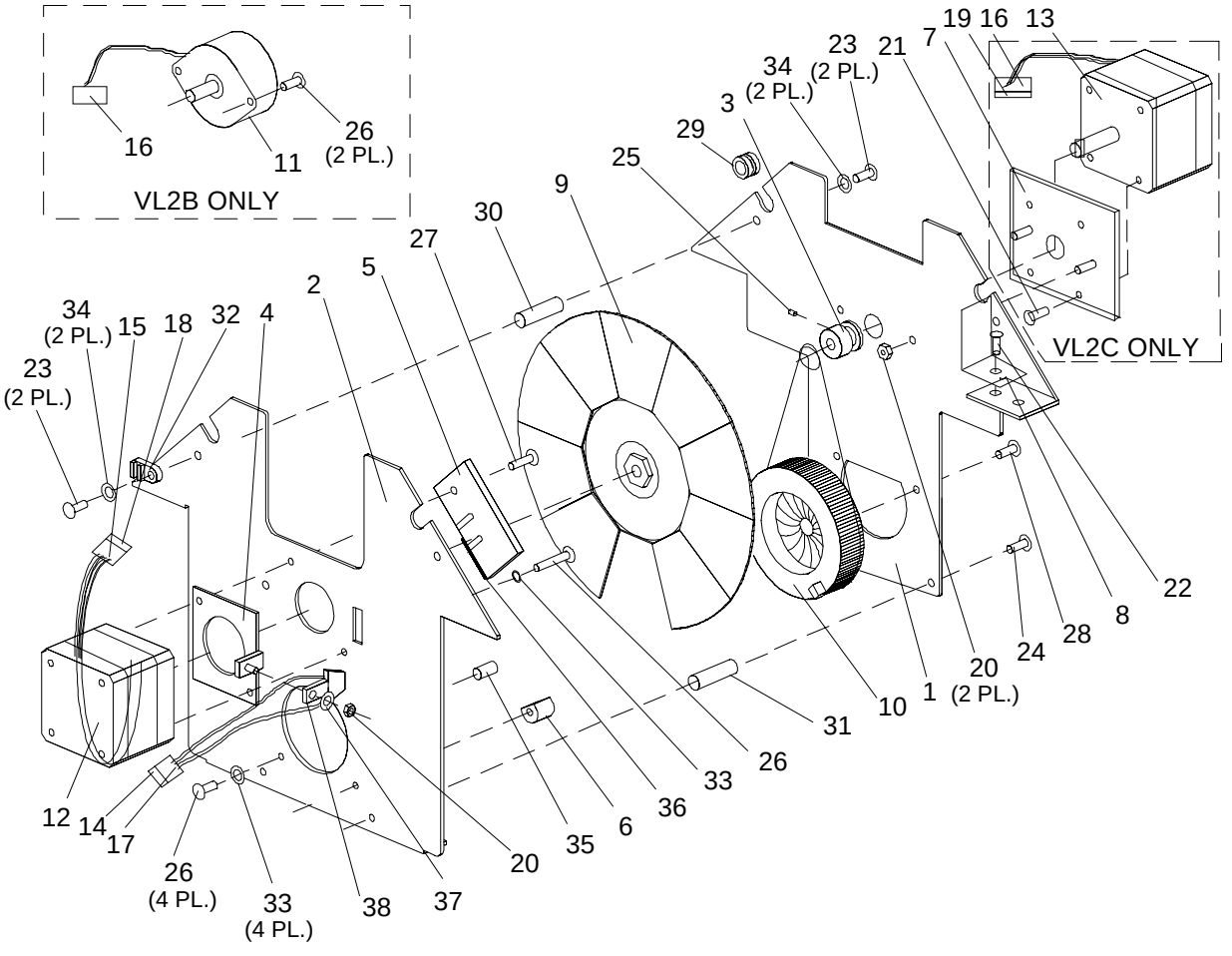


4.2.3 Assembly, Gobo/Beam Bulkhead Projector 22.1001.0001 (*VL2B*) 22.9637.0004 (VL2C)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9621.0020	1 EA	BULKHEAD, IRIS, BEAM SIZE
2	10.9621.0022	1 EA	SCREW, 4-40X5/16"PPZ
3	10.9621.0039	1 EA	PULLEY, IRIS, BEAM SIZE (**VL2B Only**)
	10.9637.0038	1 EA	PULLEY, IRIS, BEAM SIZE (**VL2C Only**)
4	10.9621.0095	1 EA	MOUNT, SENSOR, GOBO WHEEL
5	10.9621.0097	1 EA	STABILIZER, STEPPER, GOBO WHEEL
6	10.9631.0045	1 EA	STOP, BEAM SIZE IRIS
7	10.9637.0017	1 EA	PLATE, ADAPTER, BEAM MOTOR (**VL2C Only**)
8	10.9637.0035	1 EA	TAB, VL2C GOBO (**VL2C Only**)
9	22.1012.0001	1 EA	ASSY, GOBO WHEEL
10	22.1013.0001	1 EA	ASSY, BEAM SIZE IRIS
11	44.5001.0000	1 EA	MOTOR, STEPPER 7.5DEG 25 OHM COIL (**VL2B Only**)
12	44.5011.0001	1 EA	MOTOR, STEPPER 3.6DEG 9V .866"SHAFT
13	44.5018.0001	1 EA	MOTOR, STEPPER, 1.8DEG, VL2C BEAM SIZ (**VL2C Only**)
14	52.6234.0001	1 EA	CONN HOUSING, MTA CLOSED END BLU 4PIN
15	52.6245.0001	1 EA	CONN HOUSING, MTA CLOSED END NATRL 6PIN
16	52.6383.0001	1 EA	CONN HOUSING, MTA CLOSED END BLU 8PIN
17	52.6424.0004	1 EA	COVER, STRAIN RELIEF/ 4 POS MTA (**VL2C ONLY**)
18	52.6424.0006	1 EA	COVER, STRAIN RELIEF/ 4 POS MTA100 (**VL2C ONLY**)
19	52.6424.0008	1 EA	COVER, STRAIN RELIEF/ 8 POS MTA **(VL2C ONLY**)
20	53.2003.0001	3 EA	NUT, 4-40, KEP ZINC PLATED
21	53.6513.0002	4 EA	SCREW, 3MM X 5MM PFZ (**VL2C Only**)
22	53.6520.0001	1 EA	SCREW, 4-40X3/8"PPZ (**VL2C Only**)
23	53.6525.0001	4 EA	SCREW, 6-32X5/16"PPZ
24	53.6559.0001	2 EA	SCREW, 4-40X1/4"PFZ
25	53.6578.0001	1 EA	SCREW, 4-40X1/8" SET
26	53.6596.0001	7 EA	SCREW, 4-40X5/16"PPZ (**VL2B ONLY**)
	53.6596.0001	5 EA	SCREW, 4-40X5/16"PPZ (**VL2C ONLY**)
27	53.6599.0001	1 EA	SCREW, 4-40X3/8"PFZ
28	53.6601.0001	3 EA	SCREW, 4-40X3/16"PFZ
29	55.2120.0001	2 EA	GROMMET
30	55.2130.0001	2 EA	STANDOFF, 1/4"RND 6-32X7/8"L SPA

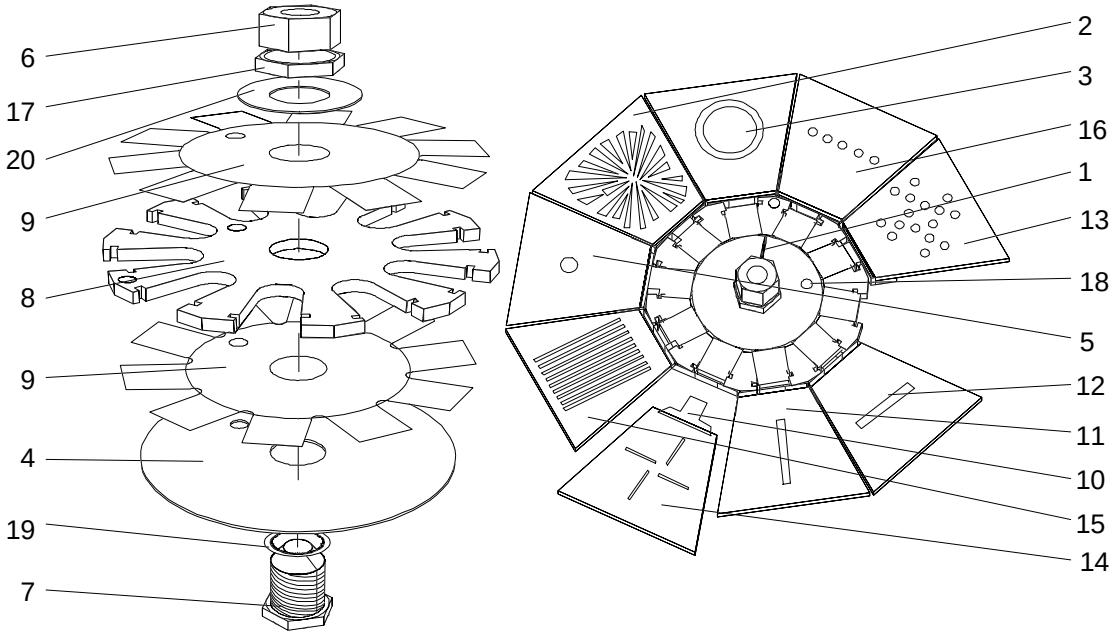
Assembly, Gobo/Beam Bulkhead Projector (continued)
22.1001.0001 (*VL2B*)
22.9637.0004 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
31	55.2138.0001	2 EA	STANDOFF, 1/4"RND 4-40X7/8" FF ALUM
32	55.2178.0001	1 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING
	55.2186.0001	1 EA	CABLE TIE, SMALL .10X4" (Not Shown)
33	55.6537.0001	5 EA	WASHER, LOCK #4 INTERNAL TOOTH
34	55.6538.0001	4 EA	WASHER, LOCK, #6 INTERNAL TOOTH
35	55.6589.0001	1 EA	STANDOFF, 1/4"RND 4-40X3/8"LF FF
36	55.6603.0001	1 EA	SPRING, SS 4.6#/IN. EXTENSION
37	55.6621.0001	1 EA	WASHER, FLAT #4 ID.120 .028THK
38	86.7001.0002	1 EA	SENSOR, REFLECTIVE OPB700AL



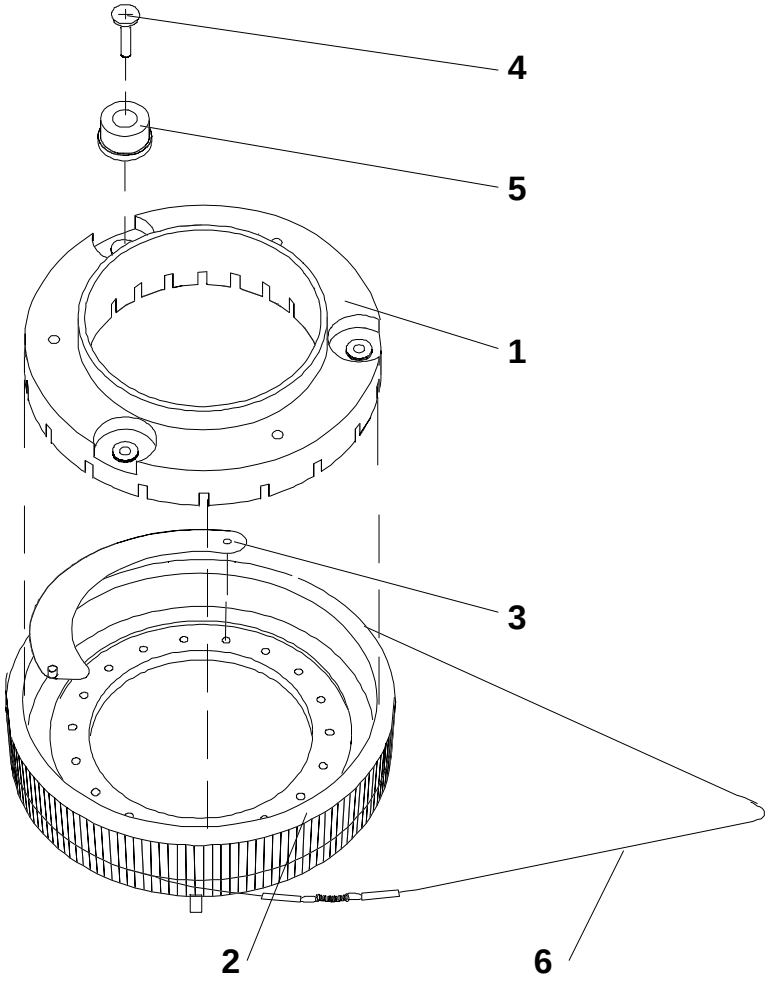
4.2.4 Assembly, Gobo Wheel 22.1012.0001

NO.	PART NO.	QTY	DESCRIPTION
1	06.6024.0090	1 EA	TAPE, BLACK CREPE, .090" WIDE (3/32")
2	10.9621.0075	1 EA	GOBO, RADIAL BREAKUP
3	10.9621.0081	1 EA	GOBO, MEDIUM CIRCLE
4	10.9621.0084	1 EA	REFLECTOR, SENSOR, GOBO WHEEL
5	10.9621.0099	1 EA	GOBO, PINHOLE
6	10.9621.0101	1 EA	NUT, LOCK, WHEEL SHAFT
7	10.9621.0103	1 EA	COLLET, SHAFT LOCK
8	10.9621.0105	1 EA	WHEEL, GOBO
9	10.9621.0105	2 EA	SPRING, FINGER, GOBO
10	10.9621.0106	9 EA	CARRIER, GOBO
11	10.9621.0120	1 EA	GOBO, SLOT, VERTICAL BOLD
12	10.9621.0121	1 EA	GOBO, SLOT, HORIZONTAL BOLD
13	10.9621.0122	1 EA	GOBO, BATHTUB DRAIN
14	10.9621.0123	1 EA	GOBO, PADDLE WHEEL
15	10.9621.0124	1 EA	GOBO, VERTICAL BARS
16	10.9621.0128	1 EA	GOBO, HORIZONTAL FIVE RAYS
17	53.2005.0001	1 EA	NUT, LOCK, WHEEL SHAFT
18	53.6530.0002	1 EA	RIVET, POP 1/8"OD X .063-.125 GR.LENGTH
19	55.6618.0001	1 EA	WASHER, LOCK INT TTH 1/2"OD X 3/8"ID
20	55.6676.0001	1 EA	WASHER, .998OD X .377ID X.030THK



4.2.5 Assembly, Beam Size Iris 22.1013.0001

NO.	PART NO.	QTY	DESCRIPTION
1	12.9621.0017	1 EA	BEAM IRIS ACTUATOR (ALT'D ITEM)
2	12.9621.0018	1 EA	BEAM IRIS FIXED RING (ALT'D ITEM)
3	12.9621.0170	16 EA	LEAF, IRIS, BEAM SIZE, OCLI BLACK
4	53.6559.0001	3 EA	SCREW, 4-40X1/4"PFZ
5	54.1207.0001	3 EA	BEARING, BALL 3/16" E
6	25.9621.0175	1 EA	CABLE ASSY, BEAM SIZE IRIS, VL2X
	55.2122.0001	1 EA	SPRING, TENSION SS
	55.2285.0001	2 EA	SLEEVE, LOOP .015 TO .022
	73.7024.0001	1 EA	CBL, STAINLESS STEEL TEFLON COATED



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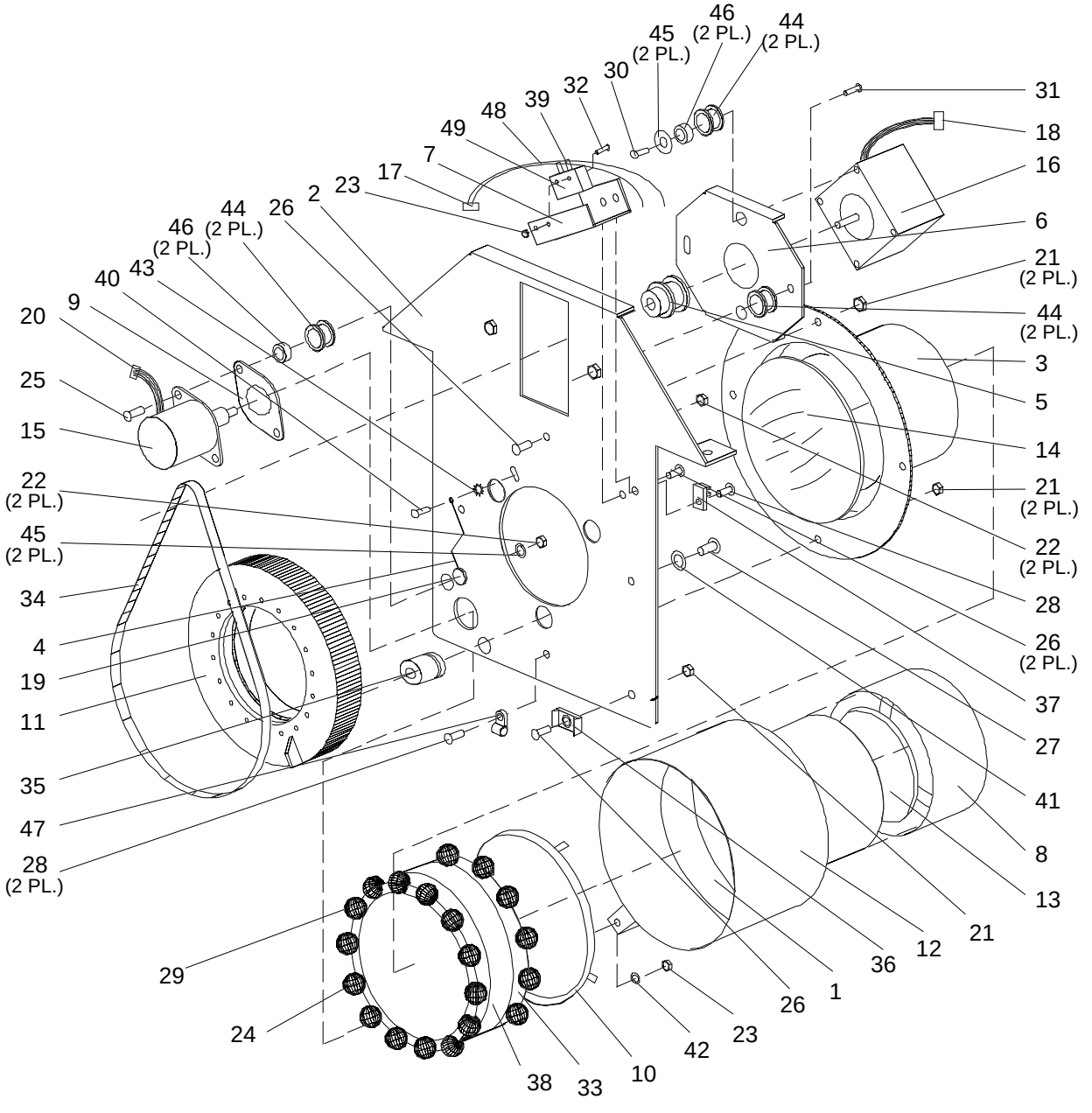
4.2.6 Assembly, Brightness/Focus Bulkhead 22.9631.0028 (*VL2B*) 22.9637.0005 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	06.6018.0001	8 IN	VELCRO LOOP, 5/8"BLK ADHESIVE BACKED
2	10.9621.0015	1 EA	BULKHEAD, BRIGHTNESS/FOCUS
3	10.9621.0026	1 EA	TUBE, BEARING, FOCUS
4	10.9621.0033	1 EA	ASSY, PUPIL OBSTRUCTION DEVICE (POD)
5	10.9621.0073	1 EA	PULLEY, DRIVE, BRIGHTNESS IRIS
6	10.9621.0074	1 EA	MOUNT, MOTOR, BRIGHTNESS IRIS
7	10.9621.0152	1 EA	HEAT SHRINK 1/8" BLK
8	10.9631.0020	1 EA	TUBE, EXTENSION, LENS
9	10.9637.0018	1 EA	PLATE, MTG., LINEAR ACTUATOR MOTOR (**VL2C Only**)
10	10.9637.0046	1 EA	BEARING, STOP, LENS VL2B/VL2C (**VL2C Only**)
11	22.1011.0001	1 EA	ASSY, BRIGHTNESS IRIS
12	22.9621.0071	1 EA	ASSY, FOCUS LENS MOUNTING TUBE
	10.9621.0027	1 EA	TUBE, MOUNTING, FOCUS LENS
	10.9621.0034	1 EA	BRACKET, ACTUATOR, FOCUS
13	42.5003.0001	1 EA	LENS, BI CONVEX, COATED
14	42.5003.0002	1 EA	LENS, PLANO CONVEX, VL2B
15	44.5013.0001	1 EA	MOTOR, LINEAR ACTUATOR,VL2C FOCUS BLKHD (**VL2B Only**)
16	44.6000.0001	1 EA	MOTOR, STEPPER .9DEG 48 OHM
17	52.6234.0001	1 EA	CONN HOUSING, MTA CLOSED END BLU 4PIN
18	52.6245.0001	1 EA	CONN HOUSING, MTA CLOSED END NATRL 6PIN
19	52.6253.0001	1 EA	PLUG, BRASS HOLE
20	52.6363.0001	1 EA	CONN HOUSING, MTA CLOSED END BLU 6PIN (**VL2B Only**)
	52.6303.0001	1 EA	PLATE, MTG., LINEAR ACTUATOR MOTOR (**VL2C Only**)
21	53.2002.0001	5 EA	NUT, 6-32 KEP ZINC PLATED
22	53.2003.0001	4 EA	NUT, 4-40, KEP ZINC PLATED
23	53.2009.0001	3 EA	NUT, #2-56
24	53.6501.0001	22 EA	BALL, NYLON 13/32 .410 DIA (WHITE)
25	53.6520.0001	2 EA	SCREW, 4-40X3/8"PPZ (**VL2B Only**)
	53.6520.0002	2 EA	SCREW, 4-40X7/16"PPZ (**VL2C Only**)
26	53.6525.0001	4 EA	SCREW, 6-32X5/16"PPZ
27	53.6526.0001	3 EA	SCREW, 6-32X5/8"PPZ
28	53.6558.0001	3 EA	SCREW, 6-32X3/8"PPZ
29	53.6561.0001	6 EA	BALL, NYLON GRADE 500P .412 +-.001(BLUE)

Assembly, Brightness/Focus Bulkhead (continued)
22.9631.0028 (*VL2B*)
22.9637.0005 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
30	53.6596.0001	2 EA	SCREW, 4-40X5/16"PPZ
31	53.6610.0003	2 EA	SCREW, 6-32x7/16"PPZ
32	53.6659.0003	2 EA	SCREW, 2-56x3/8"PPZ
33	54.1209.0001	2 EA	BEARING CAGE
34	54.2009.0001	1 EA	BELT, BFB, VL2B, .0800P, 188T, .250W, NO CORD
35	55.2113.0001	3 EA	GROMMET, IRIS MOUNTING
36	55.2178.0001	1 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING
37	55.2179.0001	1 EA	CABLE ANCHOR MOUNT, #6 SCREW MOUNTING
	55.2186.0001	3 EA	CABLE TIE, SMALL .10X4" (Not Shown)
38	55.2189.0001	1 EA	SPCR, LENS BRNG 3.008ID X .110WALL X 5/8LG
39	55.2198.0001	2 IN	HEAT SHRINK 1/8" BLK
40	55.2203.0001	1 EA	SCREW, 4-40X1/4"PPZ
41	55.6528.0001	3 EA	WASHER, FLAT #6 ZINC
42	55.6569.0001	1 EA	WASHER, LOCK #2 **(VL2B ONLY)**
43	55.6590.0011	1 EA	WASHER, LCK EXT TTH #4
44	55.6593.0001	6 EA	GROMMET
45	55.6594.0001	4 EA	WASHER, FLT #4 X 3/8"OD X .125ID X .031THK
46	55.6595.0001	4 EA	SPACER, #4
47	55.6596.0001	2 EA	CLAMP, CABLE
48	73.7021.0006	2 EA	WIRE, 24AWG BLUE TWISTED PR.
49	74.1023.0001	1 EA	SWITCH, GOLD CROSSPOINT CONTACT

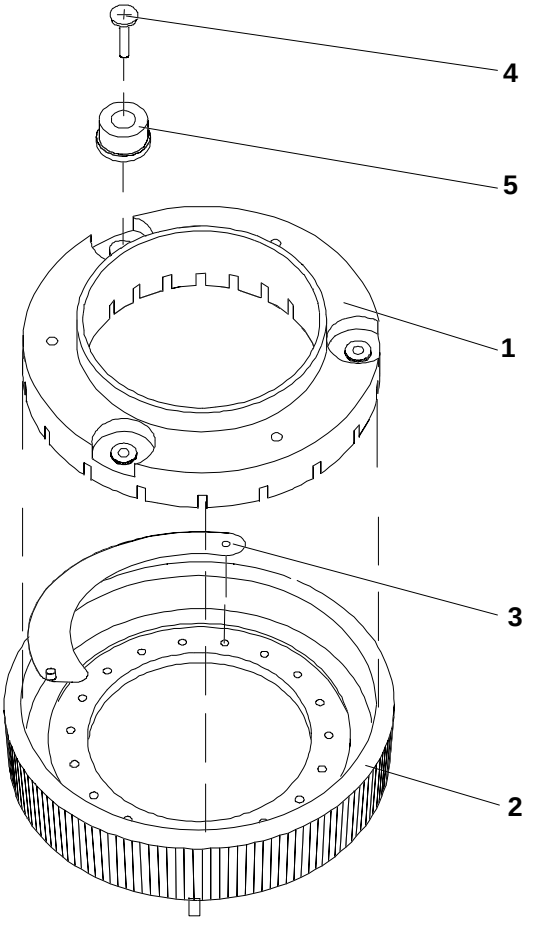
Assembly, Brightness/Focus Bulkhead (continued)
22.9631.0028 (*VL2B*)
22.9637.0005 (*VL2C*)



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4.2.7 Assembly, Brightness Iris 22.1011.0001

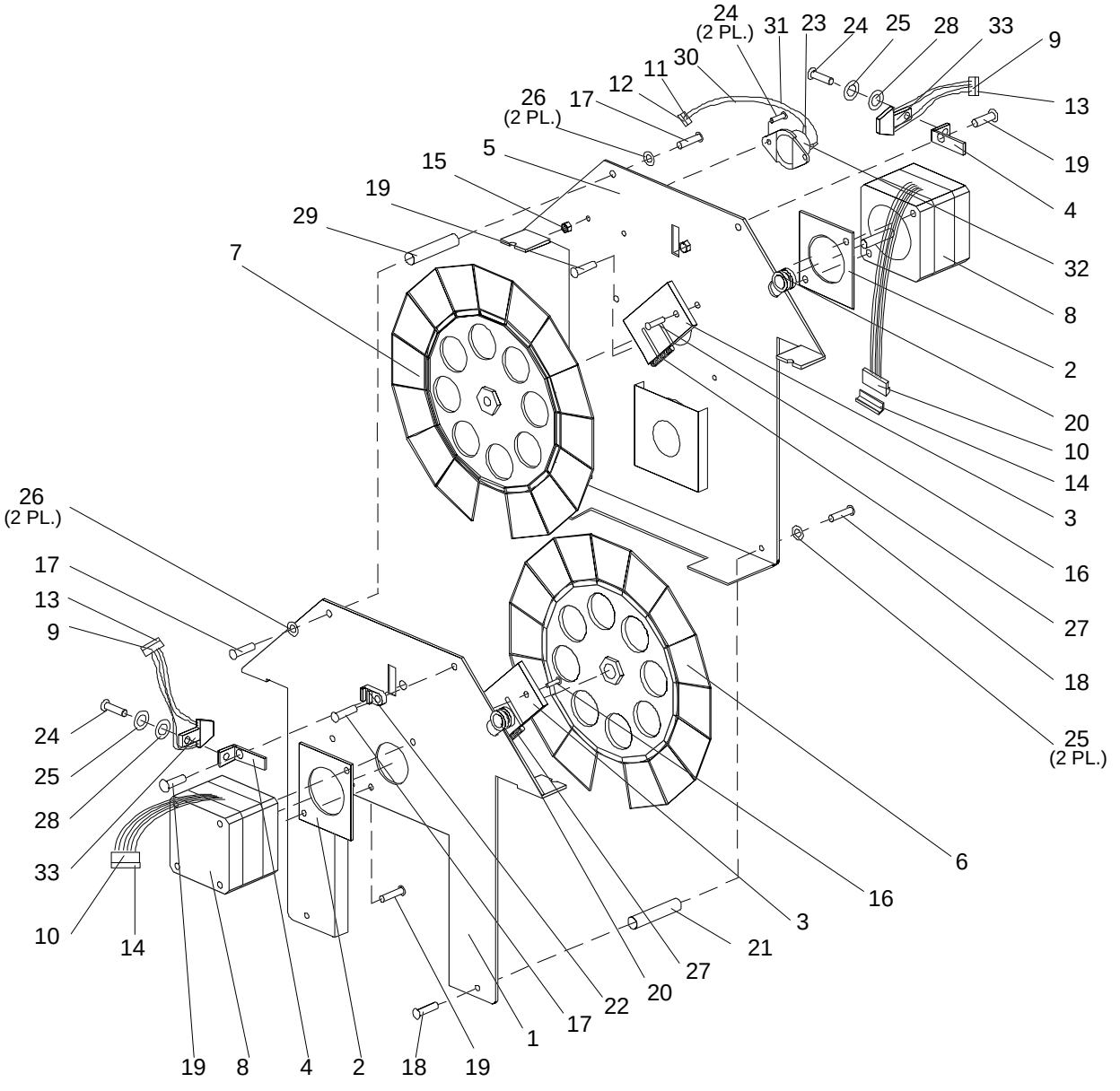
NO.	PART NO.	QTY	DESCRIPTION
1	12.9621.0011	1 EA	BRIGHTNESS IRIS ACTUATOR (ALT'D ITEM)
2	12.9621.0012	1 EA	BRIGHTNESS IRIS FIXED RING (ALT'D ITEM)
3	12.9621.0014	18 EA	LEAF, IRIS, BRIGHTNESS, PLATED
4	53.6525.0002	3 EA	SCREW, 6-32X5/16" PFZ
5	54.1208.0001	3 EA	BEARING, 1/4"



4.2.8 Assembly, Color Filter Bulkhead 22.9631.0029

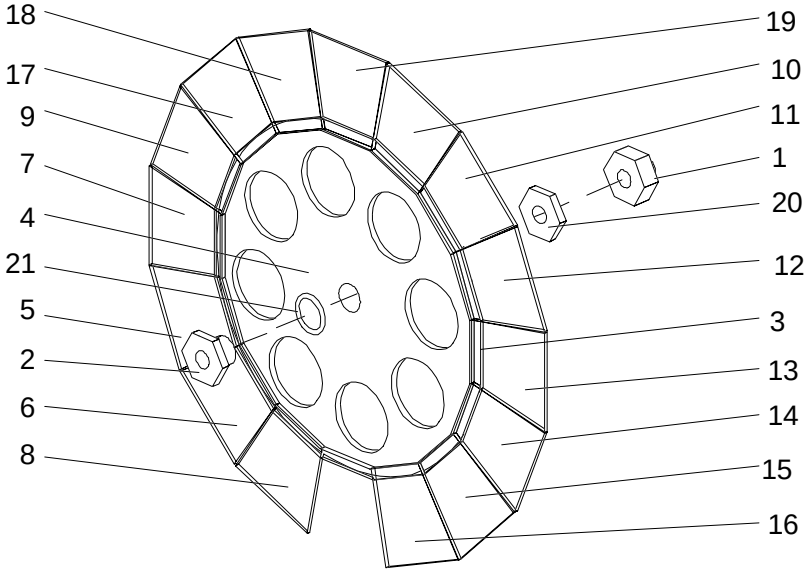
NO.	PART NO.	QTY	DESCRIPTION
1	10.9621.0021	1 EA	MOUNT, SENSOR, COLOR WHEEL
2	10.9621.0094	2 EA	SPACER, MOTOR, FRONT COLOR WHEEL
3	10.9621.0098	2 EA	STABILIZER, STEPPER, FILTER WHEEL
4	10.9621.0118	2 EA	MOUNT, SENSOR, COLOR WHEEL
5	10.9631.0021	1 EA	BULKHEAD, FILTER/APERTURE
6	22.1014.0001	1 EA	ASSY, FILTER WHEEL # 1
7	22.1015.0001	1 EA	ASSY, FILTER WHEEL # 2
8	44.5006.0001	2 EA	MOTOR, STEPPER 3.75DEG 12V .709" SHAFT
9	52.6234.0001	2 EA	CONN HOUSING, MTA CLOSED END BLU 4PIN
10	52.6245.0001	2 EA	CONN HOUSING, MTA CLOSED END NATRL 6PIN
11	52.6302.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 2PIN
12	52.6424.0002	1 EA	COVER, STRAIN RELIEF/2POS MTA
13	52.6424.0004	2 EA	COVER, STRAIN RELIEF/4POS MTA
14	52.6424.0006	2 EA	COVER, STRAIN RELIEF/6POS MTA
15	53.2003.0001	2 EA	NUT, 4-40, KEP ZINC PLATED
16	53.6520.0001	2 EA	SCREW, 4-40X3/8"PPZ
17	53.6525.0001	4 EA	SCREW, 4-40X3/8"PPZ
18	53.6577.0001	2 EA	SCREW, 4-40X5/16"PFZ
19	53.6596.0001	4 EA	SCREW, 4-40X5/16"PPZ
20	55.2120.0001	2 EA	GROMMET
21	55.2131.0001	2 EA	STANDOFF, 1/4"RND 4-40 X 1-1/4"
22	55.2178.0001	1 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING
	55.2186.0001	3 EA	CABLE TIE, SMALL .10X4" (Not Shown)
23	55.2198.0001	2 IN	HEAT SHRINK 1/8” BLK
24	55.2203.0001	4 EA	SCREW, 4-40X1/4"PPZ
25	55.6537.0001	4 EA	WASHER, LOCK #4 INTERNAL TOOTH
26	55.6538.0001	4 EA	WASHER, LOCK, #6 INTERNAL TOOTH
27	55.6603.0001	2 EA	SPRING, SS 4.6#/IN. EXTENSION
28	55.6621.0001	2 EA	WASHER, FLAT #4 ID .120 .028THK
29	55.6658.0003	2 EA	STANDOFF, 1/4"RND 6-32X1-1/4"
30	73.7046.0001	13 IN	WIRE, 22AWG STRND GREEN
31	73.7052.0001	13 IN	WIRE, 22AWG STRND WHITE
32	74.1006.0002	1 EA	SWITCH, THERMAL (OPEN 200F/CLOSE 170F)
33	86.7001.0002	2 EA	SENSOR, REFLECTIVE OPB700AL

Assembly, Color Filter Bulkhead (continued)
22.9631.0029



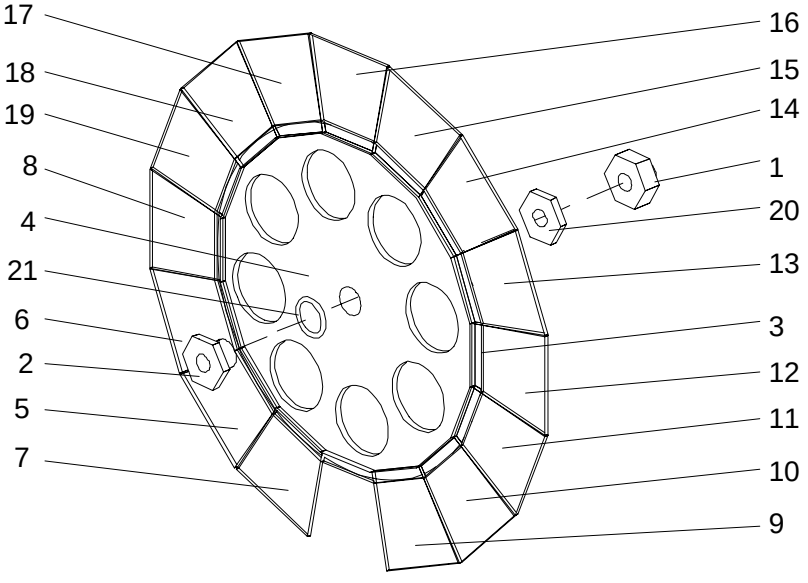
4.2.9 Assembly, Filter Wheel #1 22.1014.0001

NO.	PART NO.	QTY	DESCRIPTION
	06.6024.0090	1 EA	TAPE, BLACK CREPE, .090" WIDE (3/32") (Not Shown)
1	10.9621.0069	1 EA	NUT, LOCK, WHEEL SHAFT
2	10.9621.0102	1 EA	COLLET, LOCK, WHEEL SHAFT
3	10.9621.0301	1 EA	WHEEL, FILTER, LARGE
4	10.9621.0302	1 EA	WHEEL, FILTER, SMALL
5	41.7008.0844	1 EA	FILTER, COMPLEX COLOR 844, LAVENDER
6	41.7009.0832	1 EA	FILTER, COLOR CORRECTION (VL2B)
7	41.8014.0650	1 EA	FILTER, LONG WAVE PASS 650, DEEP RED
8	41.8015.0440	1 EA	FILTER, COLOR CORRECTION (VL2B)
9	41.9003.0440	1 EA	FILTER, SHORT WAVE PASS 440, ULTRAVIOLET
10	41.9008.0545	1 EA	FILTER, SHORT WAVE PASS 545, ROYAL BLUE
11	41.9009.0565	1 EA	FILTER, SHORT WAVE PASS 565, BLUE
12	41.9010.0580	1 EA	FILTER, SHORT WAVE PASS 580, TRQS BLUE
13	41.9011.0595	1 EA	FILTER, SHORT WAVE PASS 595, MEDIUM BLUE
14	41.9012.0610	1 EA	FILTER, SHORT WAVE PASS 610, PALE MED BL
15	41-9013.0625	1 EA	FILTER, SHORT WAVE PASS 625, PALE BLUE
16	41.9014.0640	1 EA	FILTER, SHORT WAVE PASS 640, NO CLR BLUE
17	41.9015.0470	1 EA	FILTER, SHORT WAVE PASS 470, DARK VIOLET
18	41.9016.0495	1 EA	FILTER, SHORT WAVE PASS 495, VIOLET BLUE
19	41.9017.0520	1 EA	FILTER, SHORT WAVE PASS 520, BLUE VIOLET
20	53.2005.0001	1 EA	NUT, WHEEL 3/8-32X3/32T
21	55.6618.0001	1 EA	WASHER, LOCK INT TTH 1/2"OD X 3/8"ID



4.2.10 Assembly, Filter Wheel #2 22.1015.0001

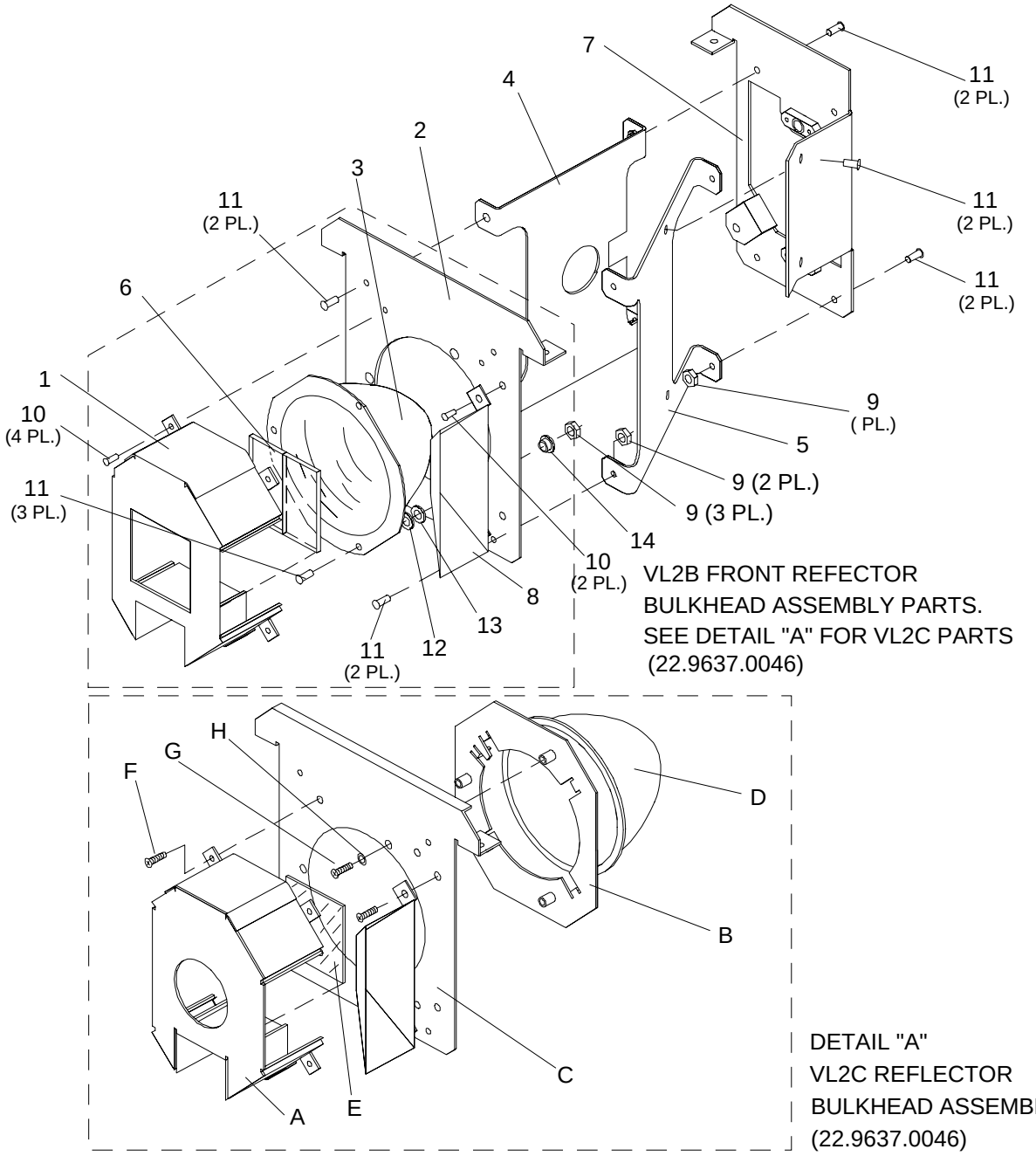
NO.	PART NO.	QTY	DESCRIPTION
	06.6024.0090	1 EA	TAPE, BLACK CREPE, .090" WIDE (3/32") (Not Shown)
1	10.9621.0069	1 EA	NUT, LOCK, WHEEL SHAFT
2	10.9621.0102	1 EA	COLLET, LOCK, WHEEL SHAFT
3	10.9621.0301	1 EA	WHEEL, FILTER, LARGE
4	10.9621.0302	1 EA	WHEEL, FILTER, SMALL
5	41.7003.0802	1 EA	FILTER, COMPLEX COLOR 802, LIGHT PINK
6	41.7004.0829	1 EA	FILTER, COMPLEX COLOR 829, PINK
7	41.7005.0837	1 EA	FILTER, COMPLEX COLOR 837, MAGENTA
8	41.7006.0839	1 EA	FILTER, COMPLEX COLOR 839, PALE LAVENDER
9	41.8003.0455	1 EA	FILTER, LONG WAVE PASS 455, PALE STRAW
10	41.8004.0470	1 EA	FILTER, LONG WAVE PASS 470, LIGHT STRAW
11	41.8005.0485	1 EA	FILTER, LONG WAVE PASS 485, STRAW
12	41.8006.0500	1 EA	FILTER, LONG WAVE PASS 500, PALE YEL GRN
13	41.8007.0515	1 EA	FILTER, LONG WAVE PASS 515, LT YELLO GRN
14	41.8008.0530	1 EA	FILTER, LONG WAVE PASS 530, GRN YELLOW
15	41.8009.0550	1 EA	FILTER, LONG WAVE PASS 550, YELLOW
16	41.8010.0570	1 EA	FILTER, LONG WAVE PASS 570, AMBER
17	41.8011.0590	1 EA	FILTER, LONG WAVE PASS 590, ORANGE
18	41.8012.0610	1 EA	FILTER, LONG WAVE PASS 610, ORANGE RED
19	41.8013.0630	1 EA	FILTER, LONG WAVE PASS 630, RED
20	53.2005.0001	1 EA	NUT, WHEEL 3/8-32X3/32T
21	55.6618.0001	1 EA	WASHER, LOCK INT TTH 1/2"OD X 3/8"ID



4.2.11 Assembly, Reflector 22.9631.0023

NO.	PART NO.	QTY	DESCRIPTION
1	10.9631.0005	1 EA	MOUNT, HOT MIRROR (**VL2B Only**)
2	10.9631.0006	1 EA	BULKHEAD, REFLECTOR, FRONT (**VL2B Only**)
	22.9637.0041	1 EA	ASSY, VL2C REFLECTOR BULKHEAD (**VL2C Only**)
A	10.9637.0041	1 EA	LIGHT TRAP, VL2C
B	10.9637.0042	1 EA	PLATE, MTG., REFLECTOR
C	10.9637.0043	1 EA	BULKHEAD, REFLECTOR, FRONT, VL2C
D	41.9637.0012	1 EA	REFLECTOR, COLD MIRROR, VL2C
E	41.9637.0047	1 EA	MIRROR, UV BLOCKER,VL2C
F	53.6520.0001	4 EA	SCREW, 4-40x3/8"PPZ
G	53.6610.0003	3 EA	SCREW, 6-32x7/16"PPZ
H	55.6538.0001	3 EA	WASHER, LOCK, #6 INTERNAL TOOTH
3	10.9631.0007	1 EA	REFLECTOR, VL2B (**VL2B Only**)
4	10.9631.0008	1 EA	BRACKET, SIDE 1, VL2B REFLECTOR (**VL2B Only**)
	10.9637.0055	1 EA	BRACKET, SIDE 1, REFLECTOR, VL2C (**VL2C Only**)
5	10.9631.0009	1 EA	BRACKET, SIDE 2, VL2B REFLECTOR (**VL2B Only**)
	10.9637.0045	1 EA	BRACKET, SIDE 2, REFLECTOR, VL2C (**VL2C Only**)
6	10.9631.0015	2 EA	MIRROR, HOT (**VL2B Only**)
7	22.9631.0004	1 EA	ASSY, VL2B REAR REFLECTOR BULKHEAD
	10.9631.0004	1 EA	BULKHEAD, REFLECTOR, REAR
	55.2233.0001	1 EA	RECEPTACLE, 1/4 TURN (VL4)
8	22.9631.0024	1 EA	ASSY, VL2B AIR DUCT
	10.9631.0016	1 EA	DUCT, AIR
	10.9631.0017	1 EA	DEFLECTOR, AIR, #1
	53.6533.0001	4 EA	RIVET, 1000R (VL 1)
9	53.2002.0001	7 EA	NUT, 6-32 KEP ZINC PLATED
10	53.6520.0001	6 EA	SCREW, 4-40X3/8"PPZ
11	53.6558.0001	13 EA	SCREW, 6-32X3/8"PPZ
12	55.6538.0003	3 EA	WASHER, FLT TEFLON, .15ID X .38OD (**VL2B Only**)
13	55.6609.0002	3 EA	WASHER, FLAT TEFL .408OD X .266ID X .062THK (**VL2B Only**)
14	55.6615.0002	3 EA	WASHER, SHOULDR NYL .360OD X .155ID X .130TK (**VL2B Only**)

Assembly, Reflector (continued)
22.9631.0023

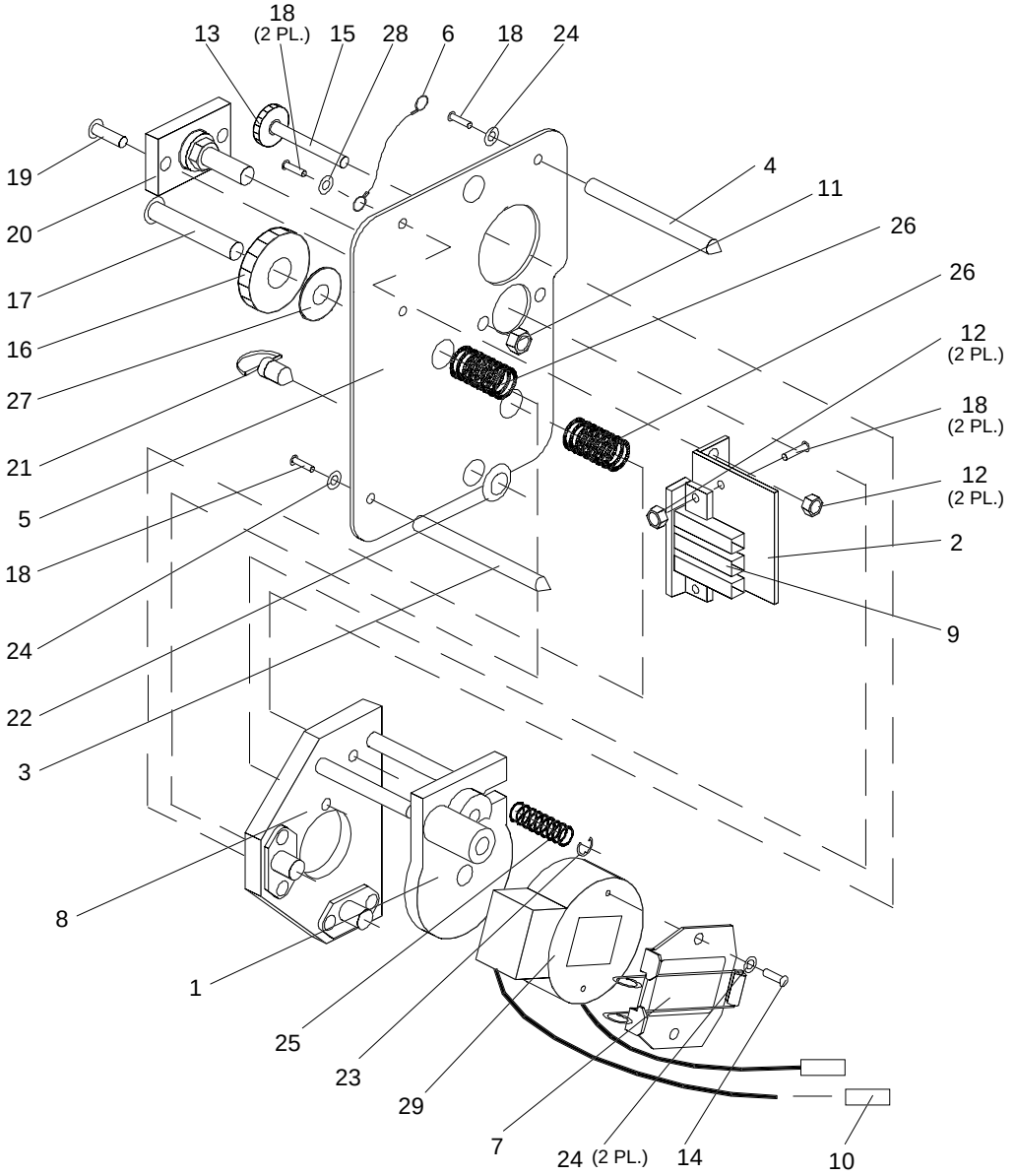


4.2.12 Assembly, Lamp 22.9631.0025 (*VL2B*) 22.4637.0058 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0240	1 EA	CARRIAGE, UNIVERSAL, LAMP
2	10.9628.0111	1 EA	BRACKET, CONNECTOR, LAMP WIRE
3	10.9628.0193	1 EA	PIN, GUIDE, LONG, LAMP ACCESS PLATE
4	10.9628.0194	1 EA	PIN, GUIDE, SHORT, LAMP ACCESS PLATE
5	10.9631.0003	1 EA	PLATE, MOUNTING, LAMP
6	22.9628.0163	1 EA	ASSY, VL4 SAFETY TETHER LMP ACCES PLTE
7	22.9628.0172	1 EA	ASSY, VL4 LAMP RETAINER
	10.9631.0001	1 EA	PLATE, TILT, LAMP
	10.9631.0002	1 EA	PIN, GUIDE, LAMP
	10.9638.0166	1 EA	PIN, VL6 LAMP DOWEL
	54.2002.0003	1 EA	RING, RETAINING EXTERNAL 3/16"ID
	55.2134.0003	2 EA	PLATE, FLOATING NUT
8	22.9631.0001	1 EA	ASSY, VL2B LAMP TILT PLATE
9	52.6264.0003	1 EA	CONN HOUSING, 30 SERIES W/FLNGS 3POS
10	52.8247.0001	2 EA	CRIMP CONTACT, S30 TIN (LOOSE)
11	53.2002.0001	2 EA	NUT, 6-32 KEP ZINC PLATED
12	53.2003.0001	4 EA	NUT, 4-40, KEP ZINC PLATED
13	55.2235.0001	1 EA	KNOB, 5/8" KNURLED #10X1/4" BLACK (**VL2B Only**)
	53.2022.0002	1 EA	NUT, THUMB, KNURLED, PD1-17, VL2C (**VL2C Only**)
14	53.6404.0003	2 EA	SCREW, 4-40X1" PPZ
15	53.6563.0001	1 EA	SCREW, 10-32X2”PPZ
16	53.6565.0003	2 EA	KNOB, KNURLED 10-32
17	53.6594.0003	2 EA	SCREW, 10-32X1-1/2"PPZ
18	53.6596.0001	6 EA	SCREW, 4-40X5/16"PPZ
19	53.6610.0003	2 EA	SCREW, 6-32x7/16"PPZ
20	54.1209.0002	1 EA	SWIVEL BEARING ASSY., .385 STUD LNGTH
21	55.2233.0002	2 EA	STUD, 1/4 TURN BAILHEAD (VL4)
22	55.2233.0003	2 EA	RETAINER, PUSH-ON TYPE (VL4)
23	55.2234.0001	1 EA	E-RING, .188 SHAFT DIA.
24	55.6537.0001	4 EA	WASHER, LOCK #4 INTERNAL TOOTH
25	55.6568.0011	1 EA	SPRING, 1-3/4" COMPRESSION (**VL2B Only**)
	55.6568.0011	1 EA	SPRING, COMPRESSION, 1"LX.300OD S/S (**VL2C Only**)
26	55.6568.0013	2 EA	SPRING, 1" COMPRESSION (**VL2B Only**)

Assembly, Lamp (continued)
22.9631.0025 (*VL2B*)
22.9637.0058 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
	55.6568.0017	2 EA	SPRING, COMPRESSION, 1 1/2LX.480OD S/S (**VL2C Only**)
	55.6595.0002	2 EA	SPACER, 1/4"RND 4 THRU 1/2" ALUM (NOT SHOWN)
27	55.6609.0001	2 EA	WASHER, FLT NYL 3/8"ID X .890OD
28	55.6621.0001	1 EA	WASHER, FLAT #4 ID.120 .028THK
29	71.2521.0001	1 EA	SOCKET, S.E. ARC LAMP



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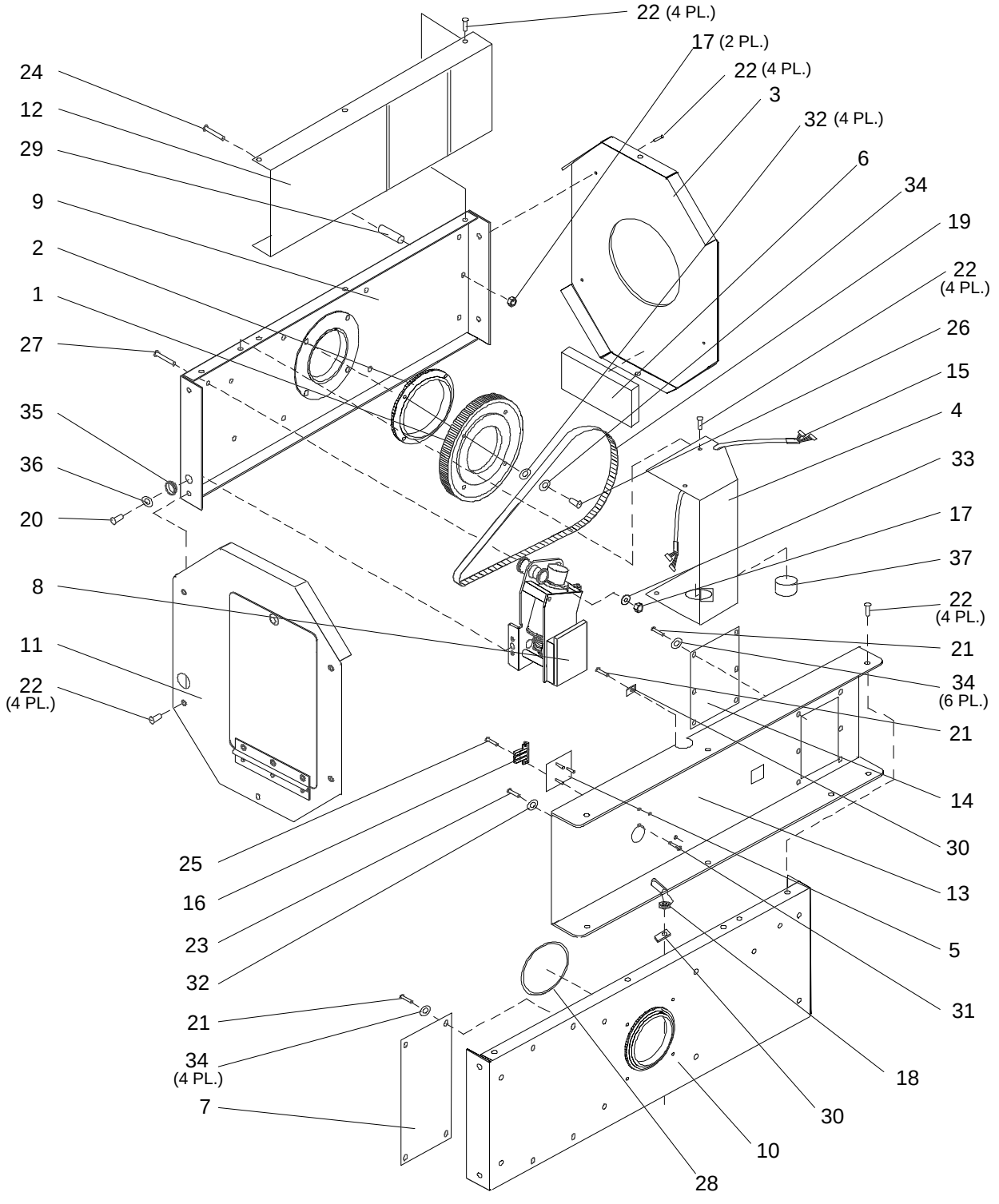
4.2.13 Assembly, Yoke Rails & Covers 22.9621.0026 (*VL2B*) 22.9637.0061 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0119	1 EA	PULLEY, DRIVEN, PAN/TILT
2	10.9620.0120	1 EA	BUSHING, DRIVEN PULLEY, PAN/TILT
3	10.9621.0040	1 EA	PLATE, APERTURE, FRONT
4	10.9631.0013	1 EA	COVER, TILT MECHANISM
5	10.9631.0034	1 EA	BRACKET, CONNECTOR, LAMP
6	10.9631.0040	1 EA	COUNTERWEIGHT
	10.9637.0013	1 EA	SEAL, TILT COVER (Not Shown) (**VL2C Only**)
7	21.9637.0031	1 EA	ASSY, VL2B APS IGNITOR
8	22.1002.0001	1 EA	ASSY, PAN/TILT MECHANISM
9	22.9621.0046	1 EA	ASSY, PULLEY SIDE RAIL
	53.6506.0001	1 EA	BEARING, TORQUE TUBE, 2.6250OD X 2.0620ID
	54.1206.0001	1 EA	RING, RETAINING 2.521" ID
10	22.9621.0049	1 EA	ASSY, CABLE SIDE RAIL
	53.6506.0001	1 EA	BEARING, TORQUE TUBE, 2.6250OD X 2.0620ID
	54.1206.0001	1 EA	RING, RETAINING 2.521" ID
11	22.9631.0027	1 EA	ASSY, VL2B REAR DOOR & COVER
	10.9631.0012	1 EA	COVER, REAR
	10.9631.0019	1 EA	DOOR, REAR
	55.2233.0001	1 EA	RECEPTACLE, 1/4 TURN (VL4)
	55.2233.0002	1 EA	STUD, 1/4 TURN BAILHEAD (VL4)
	55.2233.0003	1 EA	RETAINER, PUSH-ON TYPE (VL4)
	10.9637.0015	1 EA	SEAL, BACK COVER (**As Needed For VL2C Only**)
12	22.9631.0037	1 EA	ASSY, VL2B PULLEY SIDE RAIL COVER (**VL2B Only**)
	10.9631.0010	1 EA	COVER, RAIL, PULLEY SIDE
	55.2103.0001	1 EA	CARD GUIDE, METAL 5"
	22.9637.0053	1 EA	ASSY, VL2C PULLEY SIDE RAIL COVER (**VL2C Only**)
	10.9631.0035	2 EA	GUIDE, CARD, SHORT, MODIFIED PCG-3
	10.9631.0036	4 EA	GUIDE, CARD, LONG, MODIFIED PCG-3
	55.2103.0001	1 EA	CARD GUIDE, METAL 5"
13	22.9631.0038	1 EA	ASSY, VL2B CABLE SIDE RAIL COVER (**VL2B Only**)
	10.9631.0011	1 EA	COVER, RAIL, CABLE SIDE
	55.2103.0001	1 EA	CARD GUIDE, METAL 5"

Assembly, Yoke Rails & Covers (continued)
22.9621.0026 (*VL2B*)
22.9637.0061 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
13	22.9637.0054	1 EA	ASSY, VL2C CABLE SIDE RAIL COVER (**VL2C Only**)
	10.9631.0035	2 EA	GUIDE, CARD, SHORT, MODIFIED PCG-3
	10.9631.0036	4 EA	GUIDE, CARD, LONG, MODIFIED PCG-3
	55.2103.0001	1 EA	CARD GUIDE, METAL 5"
14	24.9621.0085	1 EA	PCB ASSY, YOKE CBL TERM (VL 2)
15	25.1010.1002	1 EA	CABLE ASSY, VL2 TILT
16	52.6264.0003	1 EA	CONN HOUSING, 30 SERIES W/FLNGS 3POS
17	53.2001.0001	4 EA	NUT, 10-32, KEPS ZINC PLATED
18	53.2002.0001	1 EA	NUT, 6-32 KEP ZINC PLATED
19	53.6504.0001	1 EA	BELT, TILT, VL2B, 1/5P, 115T, .375W, KEVLAR
20	53.6514.0001	1 EA	SCREW, 10-32X1 1/4"PPB
21	53.6522.0001	11 EA	SCREW, 6-32X1/4"PPZ
22	53.6524.0002	20 EA	SCREW, 6-32X5/16"PPB
23	53.6558.0001	1 EA	SCREW, 6-32X3/8"PPZ
24	53.6593.0001	1 EA	SCREW, 10-32X1"PPB
25	53.6596.0001	2 EA	SCREW, 4-40X5/16"PPZ
26	53.6610.0002	4 EA	SCREW, 6-32X7/16" SCB
27	53.6632.0001	3 EA	SCREW, 10-32X1 1/2"PFB
28	54.1205.0001	1 EA	RING, RETAINING 1.963" ID
29	55.2116.0001	1 EA	SPACER, 3/8"RND 10 THRU 7/8"BLK
30	55.2178.0001	2 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING
31	55.2203.0001	3 EA	SCREW, 4-40X1/4"PPZ
32	55.6517.0001	5 EA	WASHER, FLAT STEEL .375OD X .150ID X .031THK
33	55.6522.0001	3 EA	WASHER, FLAT, .750 OD, .192 ID
34	55.6538.0001	14 EA	WASHER, LOCK, #6 INTERNAL TOOTH
35	55.6579.0001	1 EA	GROMMET, 3/16 THRU FOR .090 PLATE
36	55.6599.0001	1 EA	WASHER, FLAT BLACK #10
37	55.6662.0001	1 EA	HOLE PLUG 3/4BRASS W/BLK OXIDE

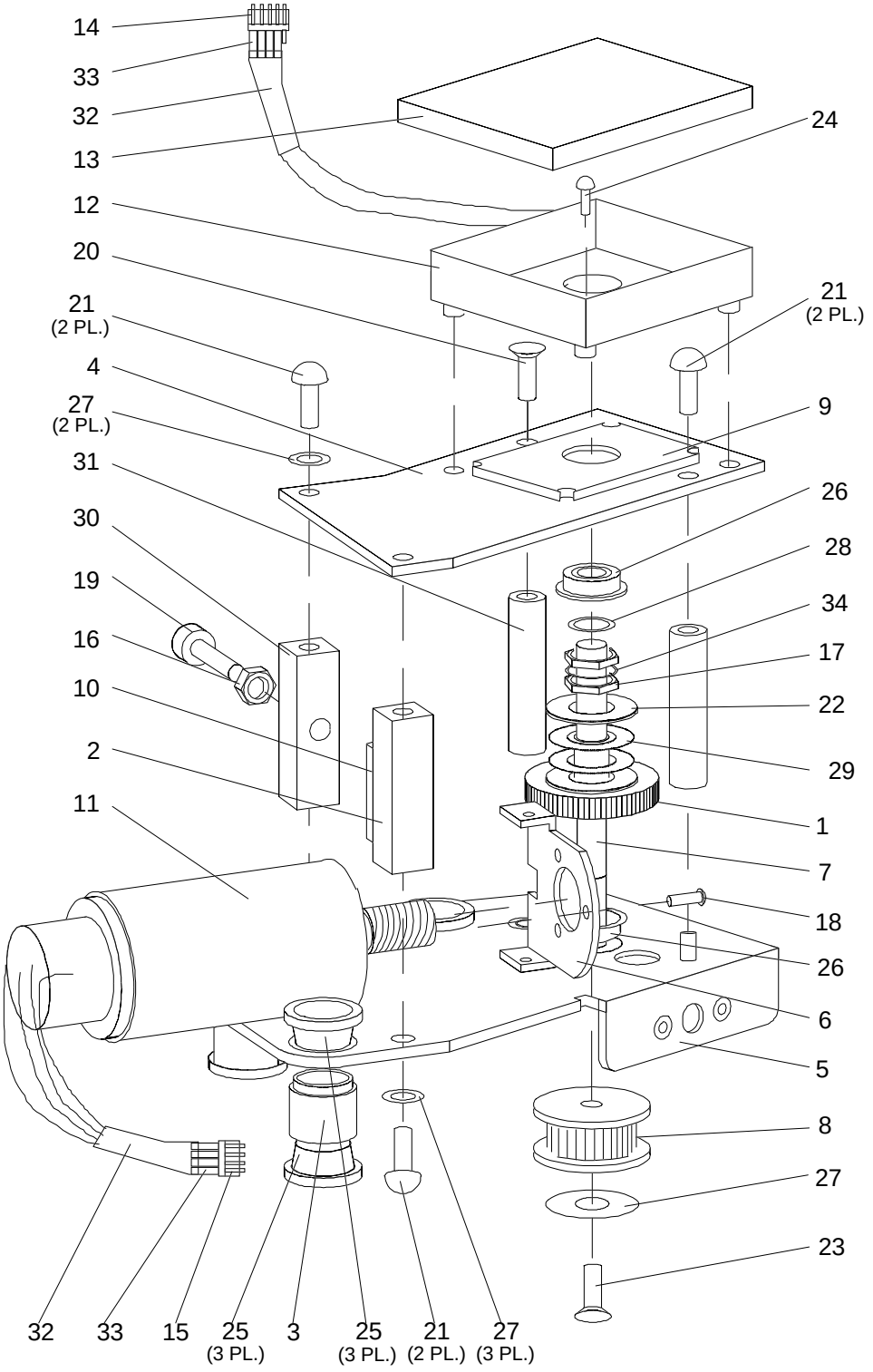
Assembly, Yoke Rails & Covers (continued)
22.9621.0026 (*VL2B*)
22.9637.0061 (*VL2C*)



4.2.14 Assembly, Pan/Tilt Mechanism 22.1002.0001

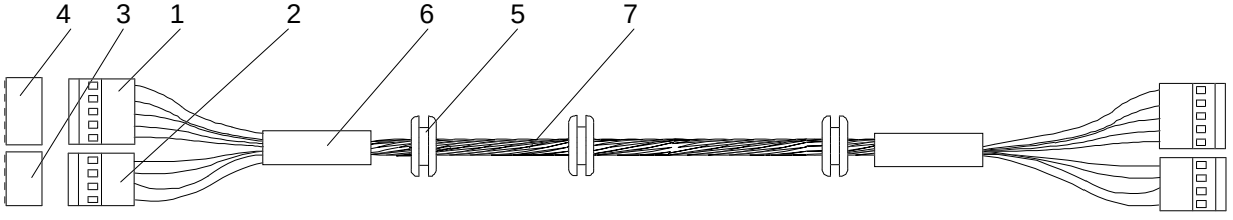
NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0005	1 EA	WHEEL, WORM, REDUCTION, PAN/TILT
2	10.9620.0101	1 EA	SPACER, ADJUSTMENT, BACKLASH
3	10.9620.0102	3 EA	LEGS, MOUNTING, PAN/TILT
4	10.9620.0105	1 EA	PLATE/MOUNT, BEARING/ENCODER, PAN & TILT
5	10.9620.0106	1 EA	PLATE, MOUNTING, PAN/TILT
6	10.9620.0107	1 EA	MOUNT, MOTOR, PAN/TILT
7	10.9620.0121	1 EA	SHAFT/CLUTCH, PAN/TILT
8	10.9620.0123	1 EA	PULLEY, DRIVE, PAN/TILT
9	10.9620.0270	1 EA	SEAL, ENCODER
10	10.9620.0293	1 EA	PAD, ANTI-BACKLASH, PTA
11	22.5007.0001	1 EA	ASSY, MAXON MOTOR
12	45.5101.0001	1 EA	ENCODER 256 COUNT
13		1 EA	Encoder Cover (Comes With Item 12)
14	52.6259.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 5PIN
15	52.6284.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 4PIN
16	53.2001.0001	1 EA	NUT, 10-32, KEPS ZINC PLATED
17	53.2005.0001	2 EA	NUT, WHEEL 3/8-32X3/32T
18	53.6513.0001	3 EA	SCREW, 2.5MM X 4MM
19	53.6515.0001	1 EA	SCREW, 10-32X3/4 SCB SCKT HD CAP
20	53.6516.0001	1 EA	SCREW, 10-32 X 3/8"PFZ
21	53.6517.0001	6 EA	SCREW, 10-32 X 3/8"PPZ
22	53.6573.0001	2 EA	WASHER, SS, .750OD X .375ID X .060THK
23	53.6591.0001	1 EA	SCREW, 6-32X1/4"PFZ
24	53.6592.0002	4 EA	SCREW, 4-40X1/2"SCB
25	54.1201.0001	6 EA	BUSHING
26	54.1208.0001	2 EA	BEARING, 1/4"
27	55.2114.0001	6 EA	WASHER, LCK INT TTH #10
28	55.2123.0001	1 EA	SPRING, WAVE 1/4"
29	55.2124.0001	2 EA	SPRING, CURVE (HIGH CARBON)
30	55.2125.0001	1 EA	STANDOFF, 3/8"SQR 10-32x1 5/16"
31	55.2133.0001	2 EA	STANDOFF, 5/16"HEX 10-32X1-5/16"SP
32	55.2197.0001	3 IN	HEAT SHRINK 3/8" BLACK
33	55.2199.0001	4 IN	HEATSHRINK, 1/16" BLACK
	55.6592.0001	2 EA	CABLE TIE, MEDIUM .10X8" (Not Shown)
34	55.6618.0001	1 EA	WASHER, LOCK INT TTH 1/2"OD X 3/8"ID

Assembly, Pan/Tilt Mechanism (continued) 22.1002.0001



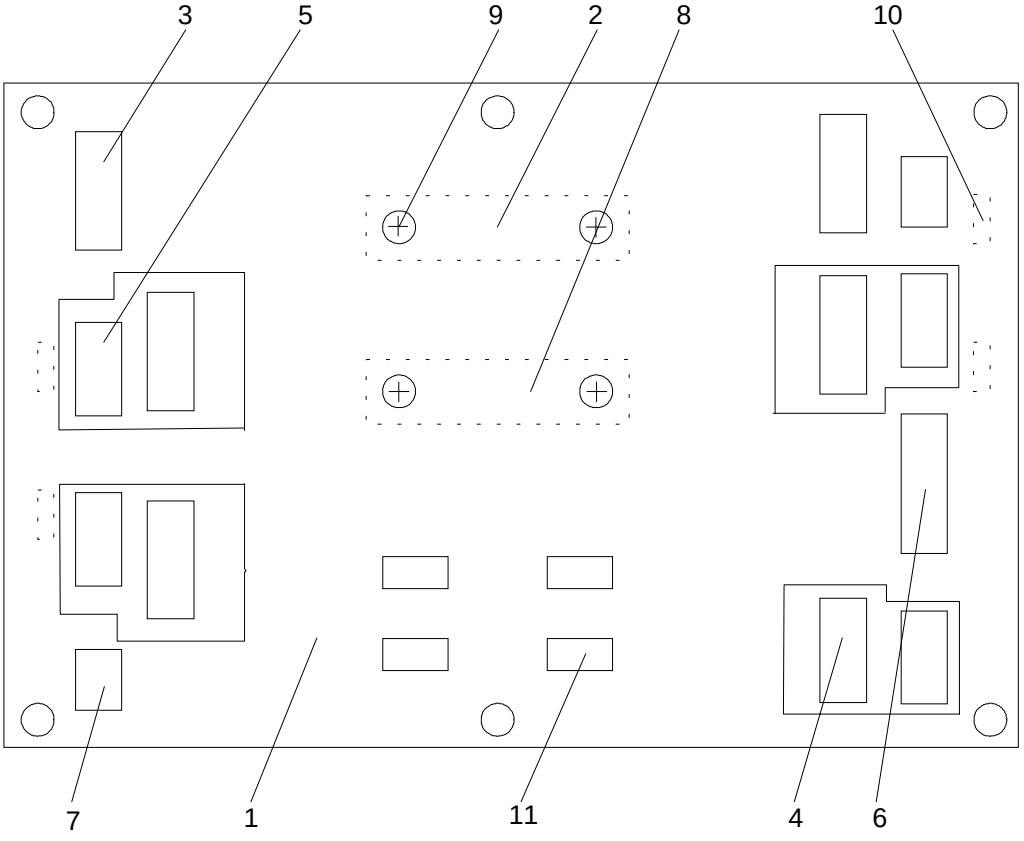
4.2.15 Cable Assembly, Tilt 25.1010.1002

NO.	PART NO.	QTY	DESCRIPTION
1	52.6270.0001	2 EA	CONN HOUSING, MTA CLOSED END RED 5PIN
2	52.6301.0001	2 EA	CONN HOUSING, MTA CLOSED END RED 4PIN
3	52.6424.0004	2 EA	COVER, STRAIN RELIEF/4POS MTA
4	52.6424.0005	2 EA	COVER, STRAIN RELIEF/5POS MTA
5	55.2120.0001	3 EA	GROMMET
6	55.2197.0001	4 IN	HEAT SHRINK 3/8" BLACK
7	73.7028.0001	23 IN	CBL. 22AWG 8COND



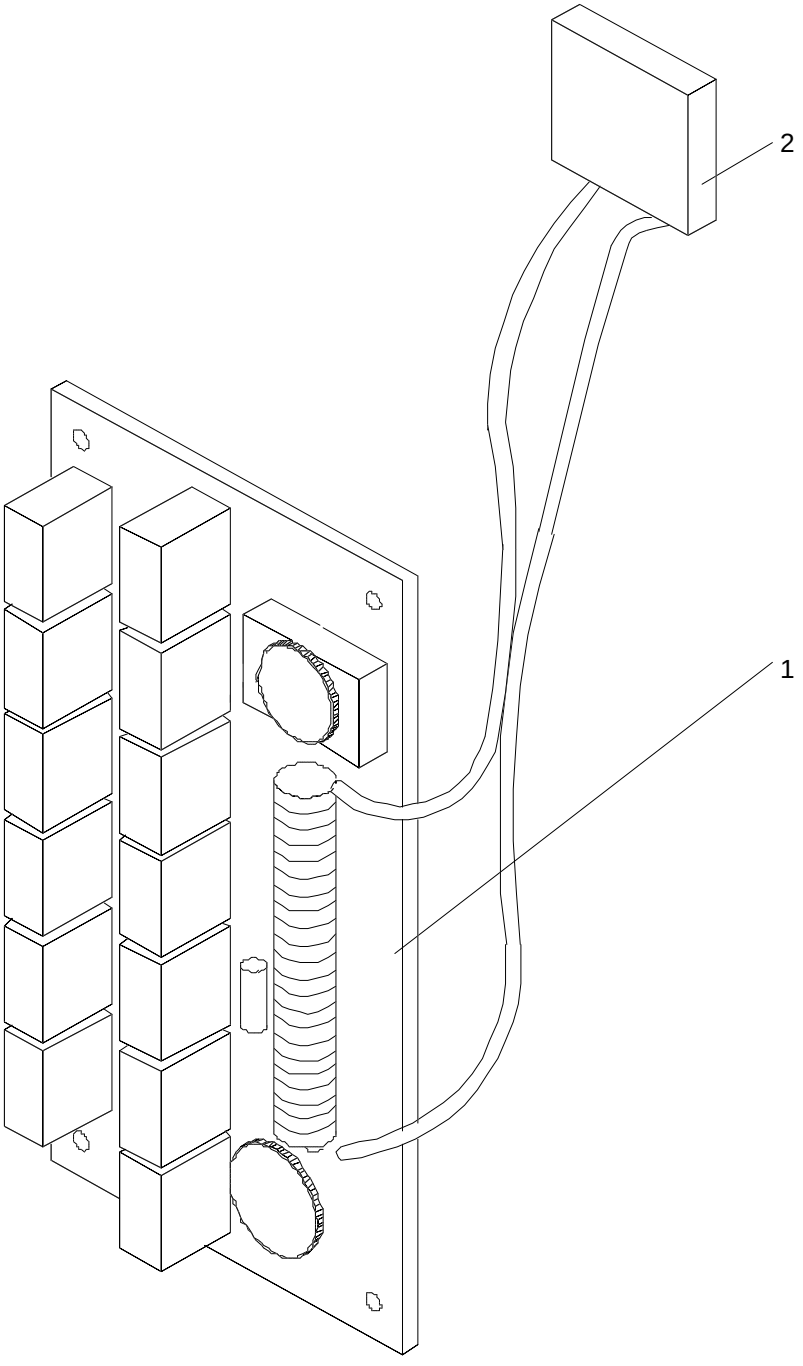
4.2.16 PCB Assembly, Yoke Cable Termination 24.9621.0085

NO.	PART NO.	QTY	DESCRIPTION
1	11.9621.0085	1 EA	PCB, YOKE CBL TERM (VL 2)
2	52.6225.0001	1 EA	HEADER ASSY, SHROUDED DBL ROW 26PIN
3	52.6240.0001	5 EA	HEADER, MTA FRCT LOK STRT POST 6PIN
4	52.6259.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 5PIN
5	52.6284.0001	5 EA	HEADER, MTA FRCT LOK STRT POST 4PIN
6	52.6296.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 8PIN
7	52.6297.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 2PIN
8	52.6364.0001	1 EA	HEADER ASSY, SHROUDED DBL ROW 24PIN
	53.2003.0001	4 EA	NUT, 4-40, KEP ZINC PLATED (Not Shown)
9	55.2203.0001	4 EA	SCREW, 4-40X1/4"PPZ
10	60.1431.1803	4 EA	RES, 1/4W 5% 180 CF
11	60.9440.1505	4 EA	RES, 2 1/4W 5% 15OHM WW



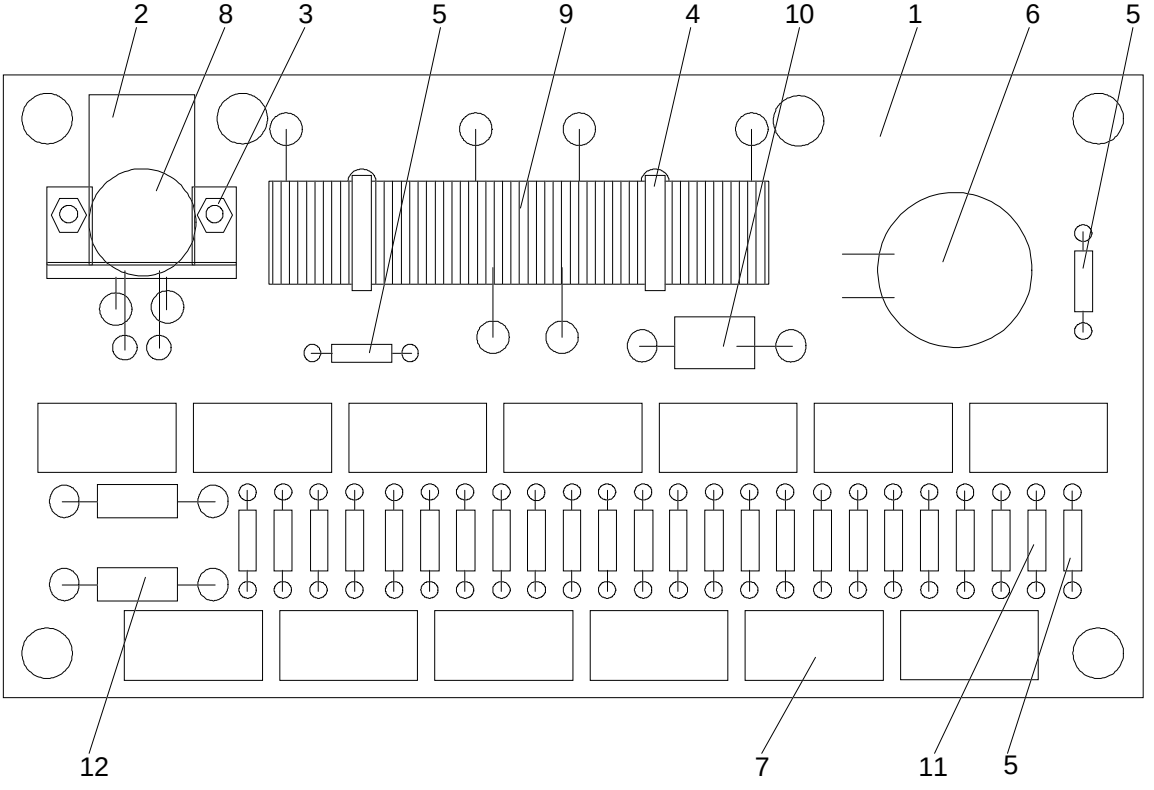
4.2.17 Assembly, APS Ignitor 21.9631.0031

NO.	PART NO.	QTY	DESCRIPTION
1	24.9631.0030	1 EA	PCB ASSY, APS IGNITOR, VL2B
2	25.9631.0032	1 EA	CABLE ASSY, APS IGNITOR (VL2B)



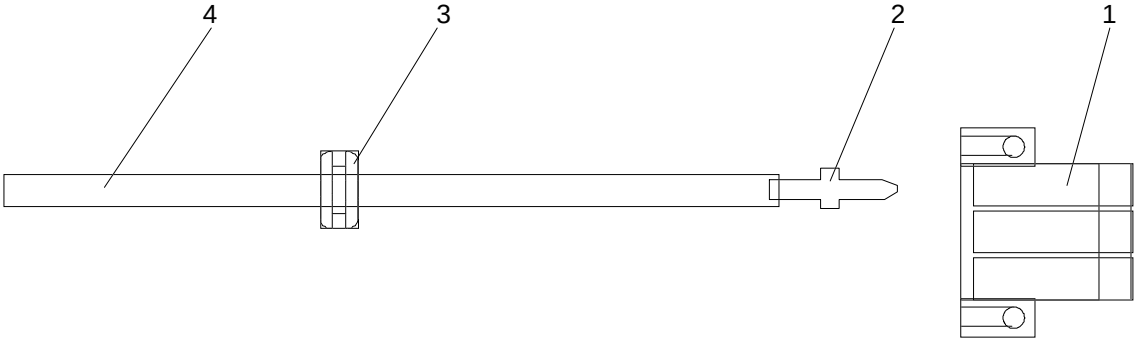
4.2.18 PCB Assembly, APS Ignitor 24.9631.0030

NO.	PART NO.	QTY	DESCRIPTION
1	11.9620.0150	1 EA	PCB, APS IGNITOR
2	52.6264.0001	1 EA	VARIS, MET-OX, 250V, 100A, RAD
	52.8209.0001	2 EA	CONTACT, 30 SERIES CONNECTOR POSTED (not shown)
3	53.2003.0001	2 EA	NUT, 4-40, KEP ZINC PLATED
	53.6520.0001	2 EA	SCREW, 4-40X3/8"PPZ (not shown)
4	55.2186.0001	2 EA	CABLE TIE, SMALL .10X4"
5	60.1422.1002	14 EA	RES, 1/4W 5% 10MEG CF
6	62.2032.0001	1 EA	CAP, .01UF, 3000V, RAD, CERAMIC, .375", 20%
7	62.3000.0033	13 EA	CAP, .033UF, 1000V, RAD, POLYPRO, .400", 10%
8	63.2001.0001	1 EA	VARIS, MET-OX, 250V, 100A, RAD
9	68.4515.0003	1 EA	INDUCTOR, HIGH VOLT, IGNITOR
10	75.7102.0001	1 EA	SPARK GAP, 2.5KV
11	82.4311.0818	12 EA	DIODE, RECTIFIER, MR818 1KV 1A
12	82.5310.6304	2 EA	DIODE, Z CLIPPER, 1.5KE180CA 180V 5W



4.2.19 Cable Assembly, APS Ignitor 25.9631.0032

NO.	PART NO.	QTY	DESCRIPTION
1	52.6265.0003	1 EA	CONN HOUSING, 30 SERIES W/FLNGS 3 POS
2	52.8247.0001	2 EA	CRIMP CONTACT, S30 TIN (LOOSE)
3	55.6585.0001	2 EA	GROMMET, 3/8"0, 5/16"0 HOLE IN .062
4	73.7027.0001	24 IN	WIRE, 16AWG 30KV CHAMPLAIN ONLY 3239B



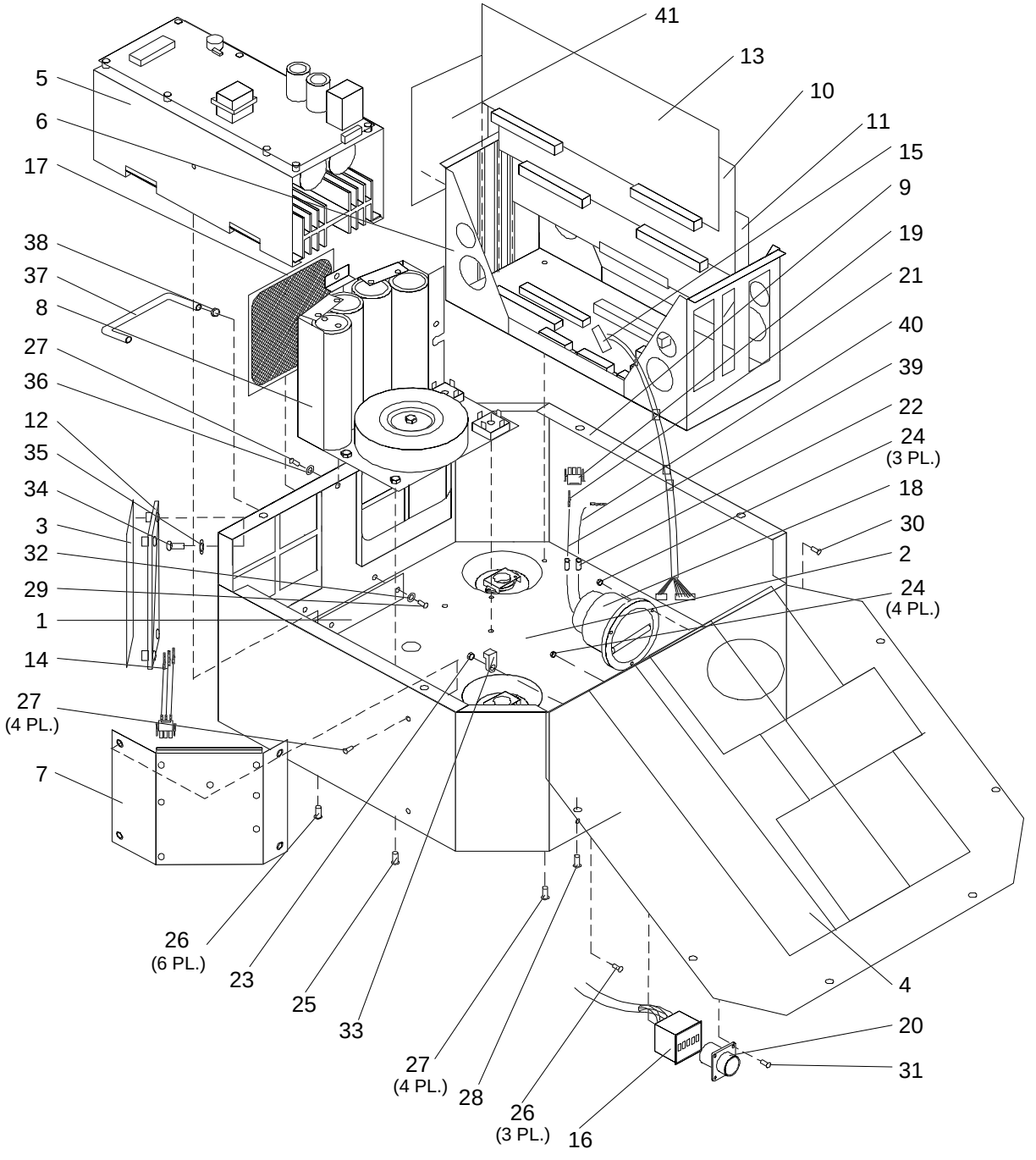
4.2.20 Assembly, Electronics Chassis 21.1005.0003 (*VL2B*) 21.1005.0004 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0155	1 EA	PLATE, DOUBLER, SAFETY HANDLE
2	10.9620.0159	1 EA	LINER, ELECTRONIC CHASSIS
3	10.9637.0016	1 EA	PAD, ISO, FAN SPEED + (**VL2C ONLY**)
4	22.1005.0001	1 EA	ASSY, VL2B CHASSIS COVER (**VL2B ONLY**)
	22.1005.0004	1 EA	ASSY, VL2C CHASSIS COVER (**VL2C ONLY**)
5	22.1006.1002	1 EA	ASSY, ARC POWER SUPPLY 400X (APS2B) (**VL2B ONLY**)
	23.1007.0001	1 EA	ASSY, VL2C APS600W (**VL2C ONLY**)
6	22.1007.0001	1 EA	ASSY, VL2 ELECTRONIC CARD CAGE (**VL2B ONLY**)
	22.9637.0010	1 EA	ASSY, VL2C CARD CAGE (**VL2C ONLY**)
7	22.1008.0001	1 EA	ASSY, VL2 AC CONTROL
8	22.1009.0001	1 EA	ASSY, VL2 TRANSFORMER (XFM2)
9	22.9620.0071	1 EA	ASSY, UPPER ENCLOS CHASS 058A/COV 058B
	10.9620.0110	2 EA	SPRING, RETAINING, AIR FILTER
	22.9620.0058	1 EA	ASSY, ELECTRONIC CHASSIS (SHEETMETAL)
	22.9637.0093	5 EA	ASSY, FASTENER, TRUSS HOOK
	53.6506.0001	2 EA	BEARING, TORQUE TUBE, 2.6250OD X 2.0620ID
	54.1206.0001	2 EA	RING, RETAINING 2.521” ID
10	23.9637.0009	1 EA	ELEC. ASSY, VL2 LCB COMBO W/ UPGRADE BD
11	24.9620.0019	1 EA	PCB ASSY, LOW VOLTAGE SUPPLY (LVS)
12	24.9623.0161	1 EA	PCB ASSY, FAN DRIVE PLUS, VL2 (**VL2C ONLY**)
13	24.9637.0050	1 EA	PCB ASSY, LV2 CIB MODIFIED FOR UPGRADE
14	25.1005.0003	1 EA	CABLY ASSY, AC POWER INPUT (VL2/3)
15	25.1005.0018	1 EA	CABLE ASSY, APS - MOTHER BOARD
16	25.7020.0001	1 EA	CABLE ASSY, THUMBWHEEL SWITCH
17	40.7101.0001	2 EA	FILTER, AIR (200S)
18	43.1001.0001	1 EA	METER, HOUR 10NL7
19	52.6237.0001	1 EA	CONN PLUG, MNLOK 5 POS
20	52.6251.0001	1 EA	RECEPT, 9 POS CHASSIS MNT LAMP
21	52.8256.0001	1 EA	SOCKET, TIN 20-14 AWG (LOOSE) MNLOK
	52.8271.0001	2 EA	FASTON RECEPT, 16-14 AWG REEL (NOT SHOWN)
22	52.8274.0001	2 EA	BUTT SPLICE, INSULATED 22-18 AWG
23	53.2002.0001	1 EA	NUT, 6-32 KEP ZINC PLATED
24	53.2003.0001	7 EA	NUT, 4-40, KEP ZINK PLATED

Assembly, Electronics Chassis (continued)
21.1005.0003 (*VL2B*)
21.1005.0004 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
25	53.6521.0001	2 EA	SCREW, 8-32 X 1/2” PPB
26	53.6524.0002	8 EA	SCREW, 6-32 X 5/16” PPB
27	53.6543.0001	9 EA	SCREW, 6-32 X 3/8” PPB
28	53.6549.0001	6 EA	SCREW, 10-32 X 3/8” PPB
29	53.6579.0001	2 EA	SCREW, 10-32 X 1/2” SCB
30	53.6592.0001	3 EA	SCREW, 4-40 X 1/2” PPB
31	53.6600.0001	4 EA	SCREW, 4-40 X 5/16” PPB
32	55.2114.0001	2 EA	WSHR, LOCK INTERNAL TOOTH #10
33	55.2178.0001	1 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING (**VL2B ONLY**)
	55.2179.0001	1 EA	CABLE ANCHOR MOUNT, #6 SCREW MOUNTING (**VL2C ONLY**)
34	55.2203.0002	4 EA	SCREW, 4-40 X 1/4” PPB (**VL2C ONLY**)
35	55.6537.0001	4 EA	WASHER, LOCK #4 INTERNAL TOOTH
36	55.6538.0001	1 EA	WASHER, LOCK #6 INTERNAL TOOTH
37	55.6559.0001	1 EA	HANDLE, 10-32 THRD BLACK OXD ST STEEL
38	55.6560.0001	2 EA	FERRULES, BLACK OXIDE STAINLESS STEEL
39	73.7006.0001	1 EA	WIRE, 16 AWG 300V 80C BLK STRND UL1061
40	73.7052.0001	1 EA	WIRE, 22 AWG STRAND WHITE
41	10.9637.0014	1 EA	AIR BLOCK, CARD CAGE (PART OF VL2C CARD CAGE ASSEMBLY) (**VL2C ONLY**)

Assembly, Electronics Chassis (continued)
21.1005.0003 (*VL2B*)
21.1005.0004 (*VL2C*)

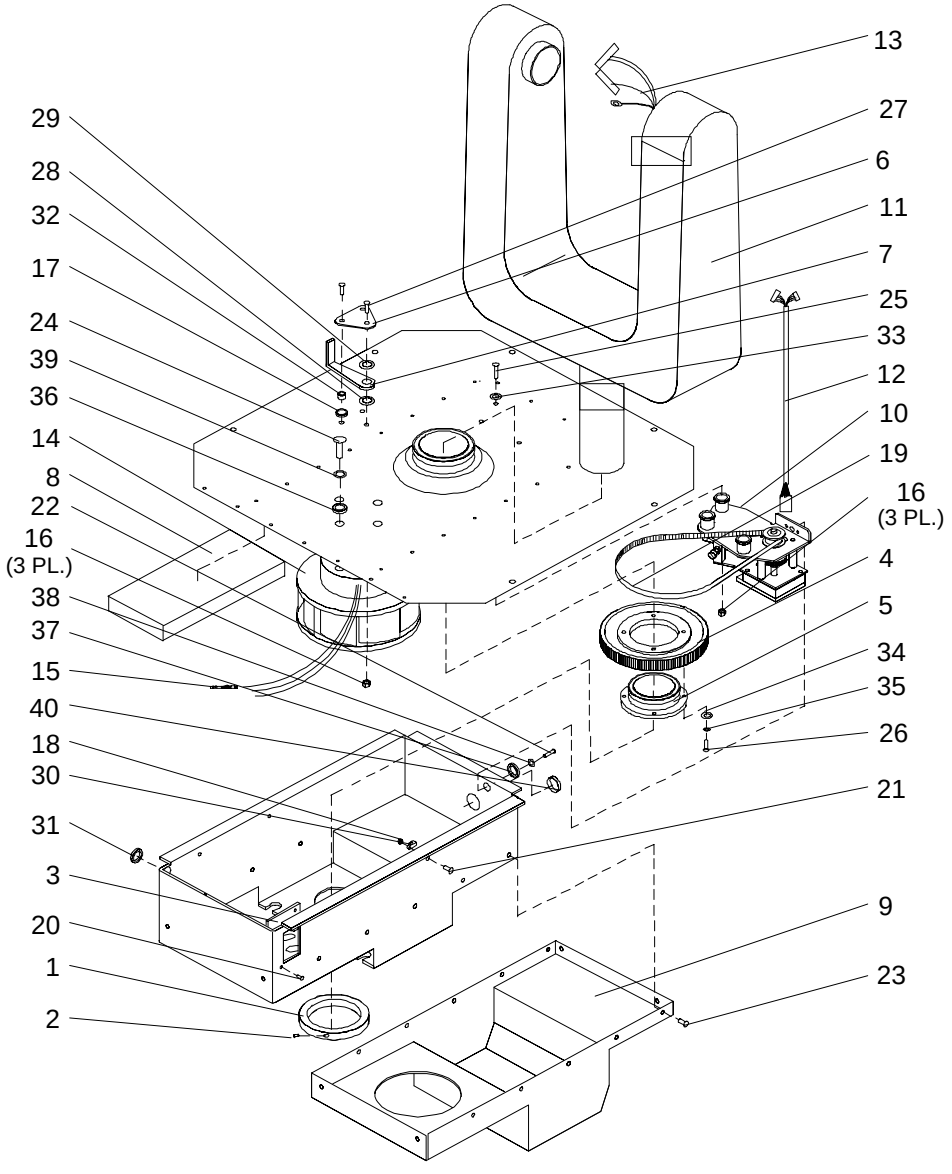


4.2.21 Assembly, Chassis Cover 22.1005.0001 (*VL2B*) 22.1005.0004 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0095	1 EA	COLLAR, PAN SHAFT
2		2 EA	SCREW, 6-32 X 7/16” SCB (PART OF ITEM 1)
3	10.9620.0114	1 EA	PLATE, GROMMET, YOKE CABLE
4	10.9620.0119	1 EA	PULLEY, DRIVEN, PAN/TILT
5	10.9620.0120	1 EA	BUSHING, DRIVEN PULLEY, PAN/TILT
6	10.9620.0153	1 EA	PLATE, PAN STOP
7	10.9620.0154	1 EA	STOP, PAN
8	10.9620.0203	1 EA	PAD, PCB, LAMP
9	10.9620.0215	1 EA	COVER, PLENUM, FAN
10	22.1002.0001	1 EA	ASSY, PAN/TILT MECHANISM
11	22.9620.0064	1 EA	ASSY, VL2/VL3 YOKE
	10.9620.0067	1 EA	WELDMENT, PAN TUBE/CHANNEL, YOKE
	10.9620.0068	1 EA	TUBE, TILT, PULLEY SIDE
	10.9620.0069	1 EA	TUBE, TILT, CABLE SIDE
12	25.1005.0010	1 EA	CABLE ASSY, PAN MECH -- MOTHER BD.
13	25.7019.0001	1 EA	CABLE ASSY, VL2B YOKE
14	40.7102.0001	1 EA	FAN, MOTORIZED IMPEL
15	52.8205.0002	3 EA	SOCKET, TIN 16AWG CRIMP (LOOSE) TYPE 3+
16	53.2001.0001	6 EA	NUT, 10-32, KEPS ZINC PLATED
17	53.2001.0003	3 EA	NUT, 10-32 NYLON INSERT (**VL2C ONLY**)
18	53.2002.0001	5 EA	NUT, 6-32 KEP ZINC PLATED
19	53.6503.0001	1 EA	BELT, PAN, VL2B, 1/5P, 95T, .375W, KEVLAR
20	53.6520.0001	2 EA	SCREW, 4-40X3/8"PPZ
21	53.6525.0001	5 EA	SCREW, 6-32X5/16"PPZ
22	53.6538.0001	1 EA	SCREW, 10-32X7/8"PPB
23	53.6577.0001	14 EA	SCREW, 4-40X5/16"PFZ
24	53.6588.0001	4 EA	SCREW, 4MMX10MM PPB
25	53.6594.0001	3 EA	SCREW, 10-32X1 1/2"PPB
26	53.6610.0002	4 EA	SCREW, 6-32X7/16"SCB
27	53.6627.0001	3 EA	SCREW, 10-32X5/8"PPB
28	55.2112.0001	1 EA	WSHER, NYLON 3/8" .352ID X .75
29	55.2124.0001	1 EA	SPRING, CURVE (HIGH CARBON)
30	55.2178.0001	5 EA	CABLE ANCHOR MOUNT, #8 SCREW MOUNTING
31	55.2182.0001	1 EA	GROMMET
32	55.2214.0001	2 EA	SPACER, 10 THRU 11/64L X 5/16R
33	55.6522.0001	3 EA	WASHER, FLAT, .750 OD, .192 ID
34	55.6528.0001	4 EA	WASHER, FLAT #6 ZINC

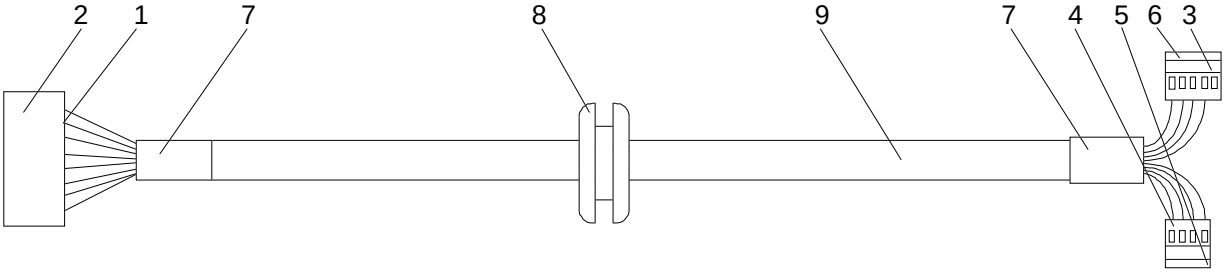
Assembly, Chassis Cover (continued)
22.1005.0001 (*VL2B*)
22.1005.0004 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
35	55.6538.0001	4 EA	WASHER, LOCK #6 INTERNAL TOOTH
36	55.6579.0001	4 EA	GROMMET, 3/16 THRU FOR .090 PLATE
37	55.6579.0002	1 EA	GROMMET, .183"0THRU X 3/8HOLR IN 1/8"PL
38	55.6599.0001	1 EA	WASHER, FLAT BLACK #10
39	55.6620.0001	4 EA	WASHER, FLAT 4MM BLACK 1/2"OD
40	55.6662.0001	1 EA	HOLE PLUG 3/4"BRASS W/BLK OXIDE



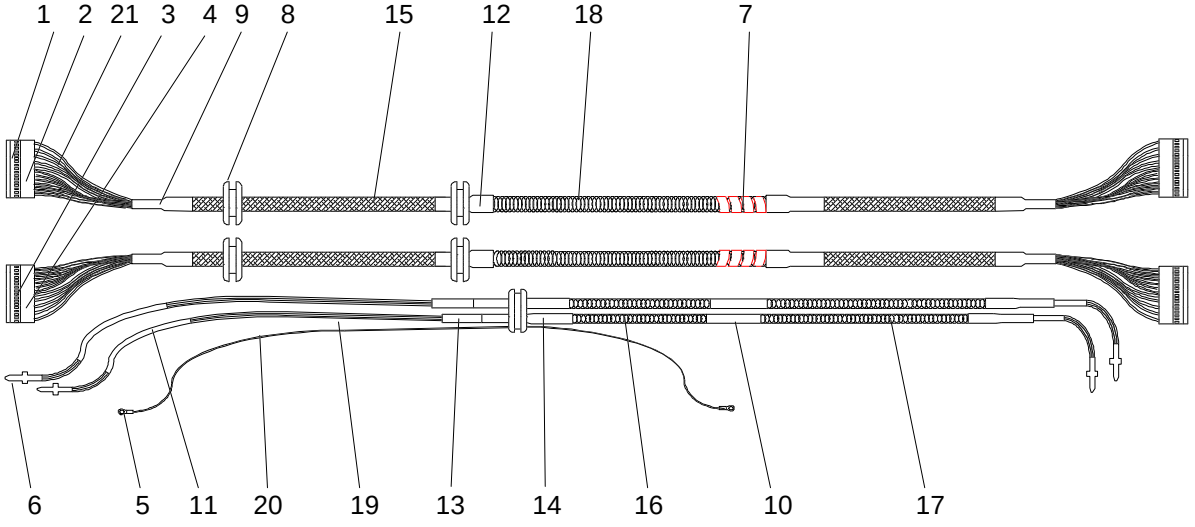
4.2.22 Cable Assembly, Pan Mech – Mother Bd 25.1005.0010

NO.	PART NO.	QTY	DESCRIPTION
	52.6206.0001	1 EA	COVER, BACK MT RECEPT 10 POS
1	52.6208.0001	1 EA	CONN HOUSING, MT RECEPT 10 POS
2	52.6209.0001	1 EA	COVER, POLARIZING MT RECEPT 10 POS
3	52.6270.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 5 PIN
4	52.6301.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 4 PIN
5	52.6424.0004	1 EA	COVER, STRAIN RELIEF/4 POS MTA
6	52.6424.0005	1 EA	COVER, STRAIN RELIEF/5 POS MTA
7	55.2197.0001	2 IN	HEAT SHRINK 3/8” BLACK
8	55.6602.0001	1 EA	GROMMET 1/4” 0 THRU 3/8” HOLE 1/8” PLATE
9	73.7028.0001	26 IN	CBL. 22 AWG 8 COND



4.2.23 Cable Assembly, Yoke 25.7019.0001

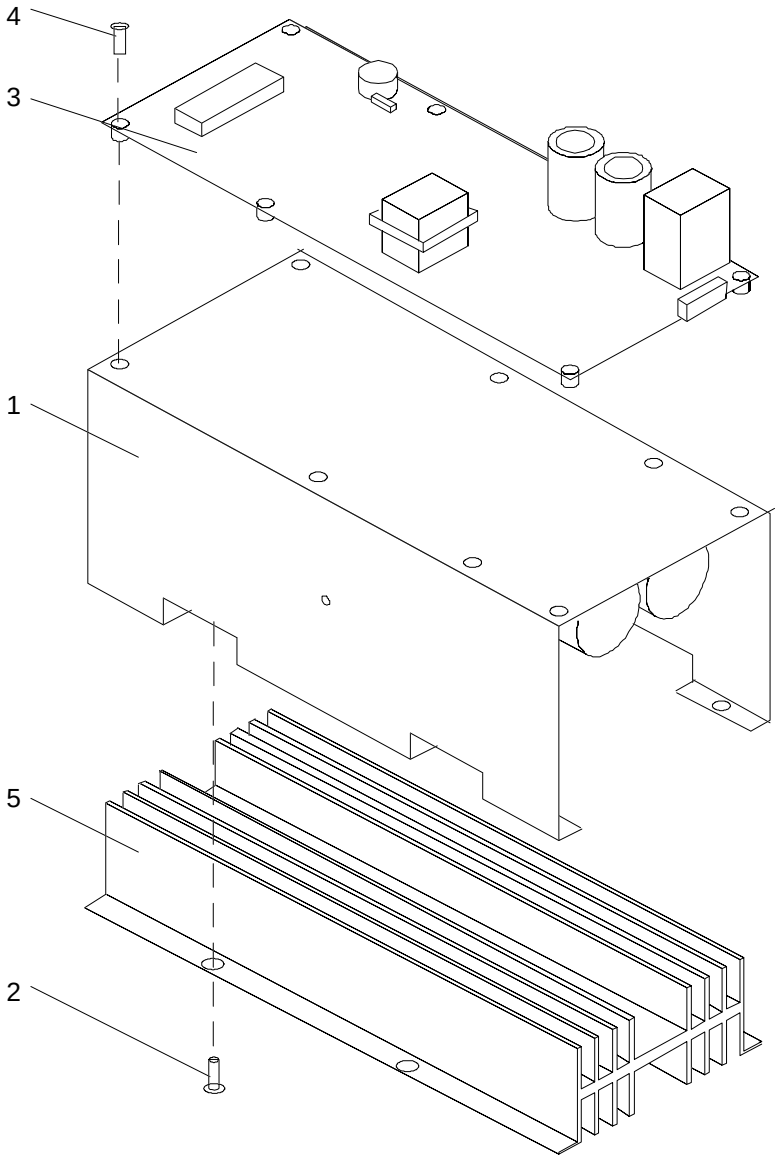
NO.	PART NO.	QTY	DESCRIPTION
	52.6222.0001	2 EA	COVER, BACK MT 24 PIN (not shown)
1	52.6223.0001	2 EA	COVER, LATCH MT RECEPT 24 PIN
2	52.6224.0001	2 EA	CONN HOUSING, MT RECEPT 24 POS
3	52.6226.0001	2 EA	COVER, BACK MT 26 POS 30-26 AWG
	52.6227.0001	2 EA	COVER, LATCH MT RECEPT 26 POS (not shown)
4	52.6228.0001	2 EA	CONN HOUSING, MT RECEPT 26 POS
5	52.8245.0001	2 EA	TERM, RING #10 16-14 AWG (REEL)
6	52.8247.0001	4 EA	CRIMP CONTACT, S30 TIN (REEL)
7	55.2180.0002	1 EA	SPIRAL WRAP, 3/8” OD TEFLON
8	55.2182.0001	5 EA	GROMMET
9	55.2197.0002	12 IN	HEAT SHRINK 3/8” YELLOW
10	55.2200.0001	12 IN	HEAT SHRINK 3/16” BLACK
11	55.2200.0002	14 IN	SLEEVING, SIL RUB COATED FBRGLAS .162 ID
12	55.6695.0001	8 IN	HEAT SHRINK, ADHESIVE WALL, 1/2”
13	55.6695.0002	12 IN	HEAT SHRINK, ADHESIVE WALL 3/8”
14	55.6695.0003	26 IN	HEAT SHRINK, ADHESIVE 1/4” BLACK
15	55.6699.0003	64 IN	SLEEVING, POLY EXP BRAIDED 1/2” NOM. DIA.
16	55.9620.0272	2 EA	SPRING, LAMP WIRE, 8”
17	55.9628.0174	2 EA	SPRING, LAMP WIRE, 24” (VL4)
18	55.9628.0175	2 EA	SPRING, YOKE CABLE, 24” (VL4)
19	73.6222.0006	528 IN	WIRE, 22 AWG 600V 200C TFE BLUE UL1199
20	73.7008.0001	40 IN	WIRE, 16 AWG 300V 80C GRN STRND UL1061
21	73.7083.0001	148 IN	CBL, 24 AWG 26 COND NO JCKT/VL4 YOKE



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4.2.24 Assembly, Arc Power Supply 22.1006.1002 (*VL2B*) 23.9637.0008 (*VL2C*)

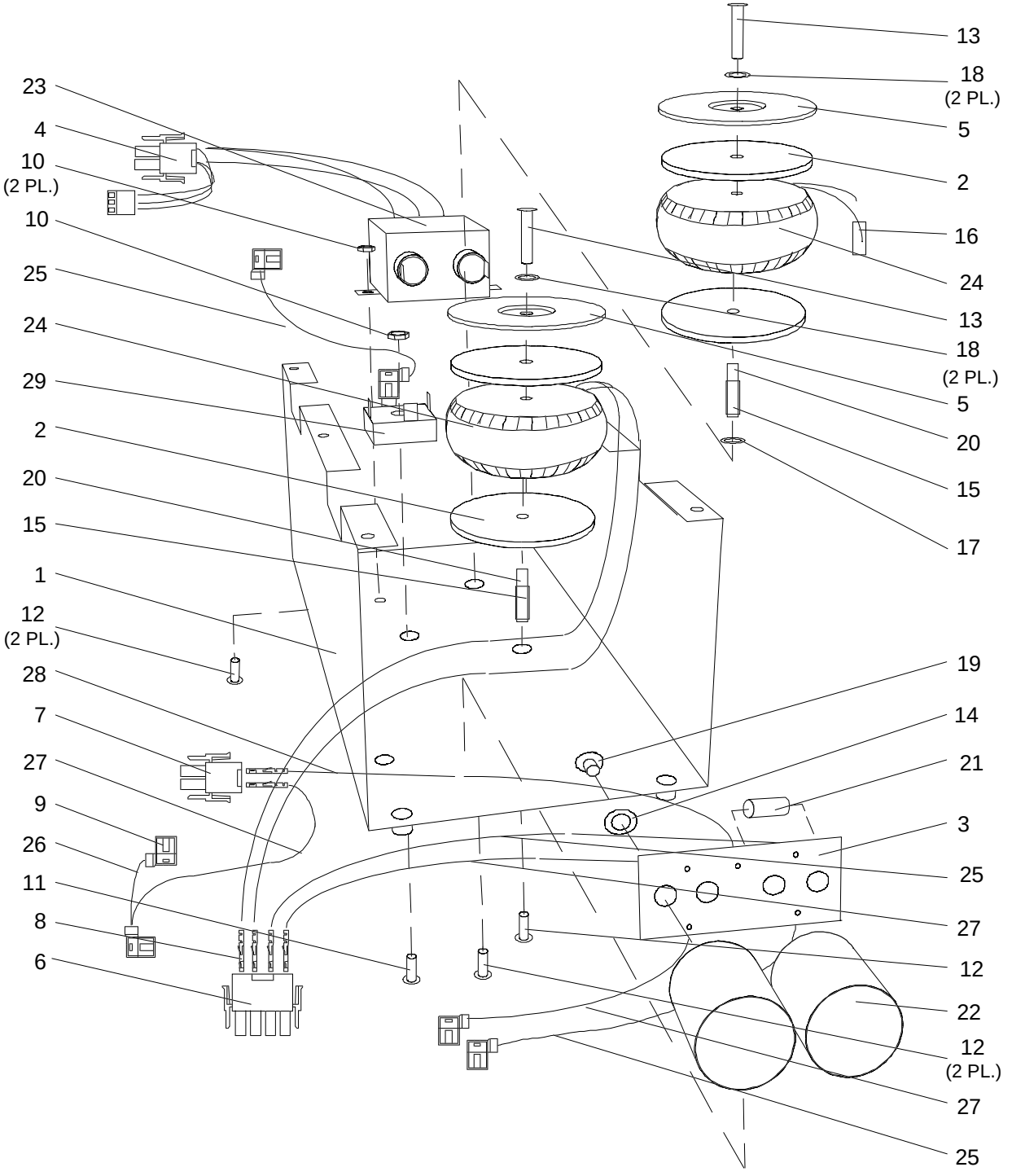
NO.	PART NO.	QTY	DESCRIPTION
1	22.1017.0001	1 EA	ASSY, ARC PWR SUPPLY CHASSIS (**VL2B ONLY**)
	22.9637.0056	1 EA	ASSY, APS 600 CHASSIS (**VL2C ONLY**)
2	22.1036.1002	1 EA	ASSY, APS 400X HEAT SINK
3	24.9620.2146	1 EA	PCB ASSY, APS 400X CONTROL (**VL2B ONLY**)
	24.9637.0057	1 EA	PCB ASSY, APS 600 CONTROL (**VL2C ONLY**)
4	53.6522.0001	7 EA	SCREW, 6-32 X 1/4" PPZ
5	53.6613.0001	4 EA	SCREW, 6-32 X 1/2" PPZ



4.2.25 Assembly, Arc Pwr Supply Chassis 22.1017.0001 (*VL2B*) 22.9637.0056 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.00054	1 EA	CHASSIS, LPS
2	10.9620.0157	4 EA	PAD, CHOKE, APS
3	11.9620.0165	1 EA	PCB, CAPACITOR TERMINATION
4	25.7024.0001	1 EA	CABLE ASSY, ACB-LPS INTERCONNECT
5	46.6003.0001	2 EA	MOUNTING DISC, METAL 60MM DIA
6	52.6319.0001	1 EA	PLUG HOUSING, MNLOK 4 POS
7	52.6346.0001	1 EA	PLUG HOUSING, MNLOK 2 POS
8	52.8206.0001	6 EA	CONTACT SCKT, 20 AWG TIN MNLOK (LOOSE)
9	52.8244.0001	6 EA	FASTON RECEPT FLAG, .250 16-14 AWG (LOOSE)
10	53.2002.0001	3 EA	NUT, 6-32 KEP ZINC PLATED
11	53.6582.0001	1 EA	SCREW, 6-32 X 3/4” PFZ
12	53.6609.0001	4 EA	SCREW, 6-32 X 3/8” PFZ
13	53.6616.0001	2 EA	SCREW, 6-32 X 3/4” PPZ
14	55.2114.0001	4 EA	WASHER, LCK INT TTH #10
	55.2186.0001	10 EA	CABLE TIE, SMALL .10X4”
15	55.2197.0001	2 IN	HEAT SHRINK 3/8” BLACK
16	55.2200.0001	20 IN	HEAT SHRINK, 3/16” BLACK (**VL2C ONLY**)
17	55.6503.0002	1 EA	WASHER, FLA #8 .43 OD (**VL2C ONLY**)
18	55.6528.0001	4 EA	WASHER, FLAT #6 ZINC
19	55.6564.0001	4 EA	SCREW, 10-32 X 5/16” PPZ
20	55.6654.0003	2 EA	STANDOFF, 1/4” RND 6-32 X 1” AL (VL1)
21	60.4430.4702	2 EA	RES, 2W 5% 47K MF
22	62.2028.0471	2 EA	CAP, 470UF, 200V, RAD, ALUMNUM, .500”, REF
23	67.4001.0001	1 EA	FILTER, EMI 250V 10A (CORCOM 10K1)
24	68.4516.0001	2 EA	CHOKE, TOROID 110 TURNS
25	73.7006.0001	15 IN	WIRE, 16AWG 300V 80C BLK STRND UL1061
26	73.7007.0001	21 IN	WIRE, 16AWG 300V 80C WHT STRND UL1061
27	73.7012.0001	11 IN	WIRE, 16AWG 300V 80C RED STRND UL1061
28	73.7043.0001	1 EA	WIRE, 16AWG 300V 80C VIO STRND UL1061
29	82.4303.2506	1 EA	BRIDGE RECTIFIER, MDA2506 600V 25A (OR GBPC25-06)

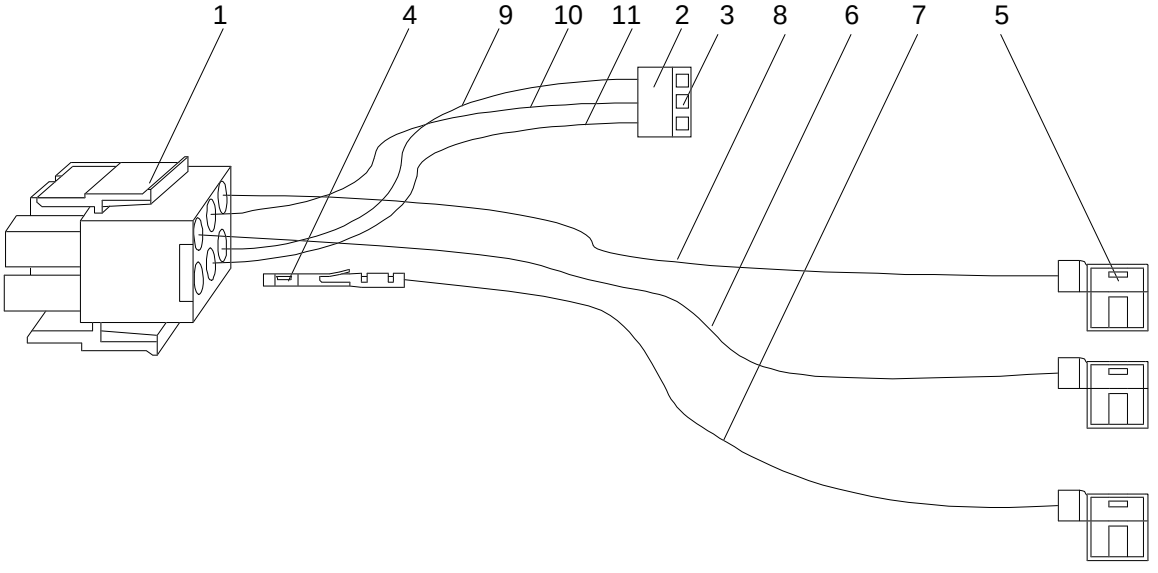
Assembly, Arc Pwr Supply Chassis (continued)
22.1017.0001 (*VL2B*)
22.9637.0056 (*VL2C*)



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4.2.26 Cable Assembly, ACB-LPS Interconnect 25.7024.0001

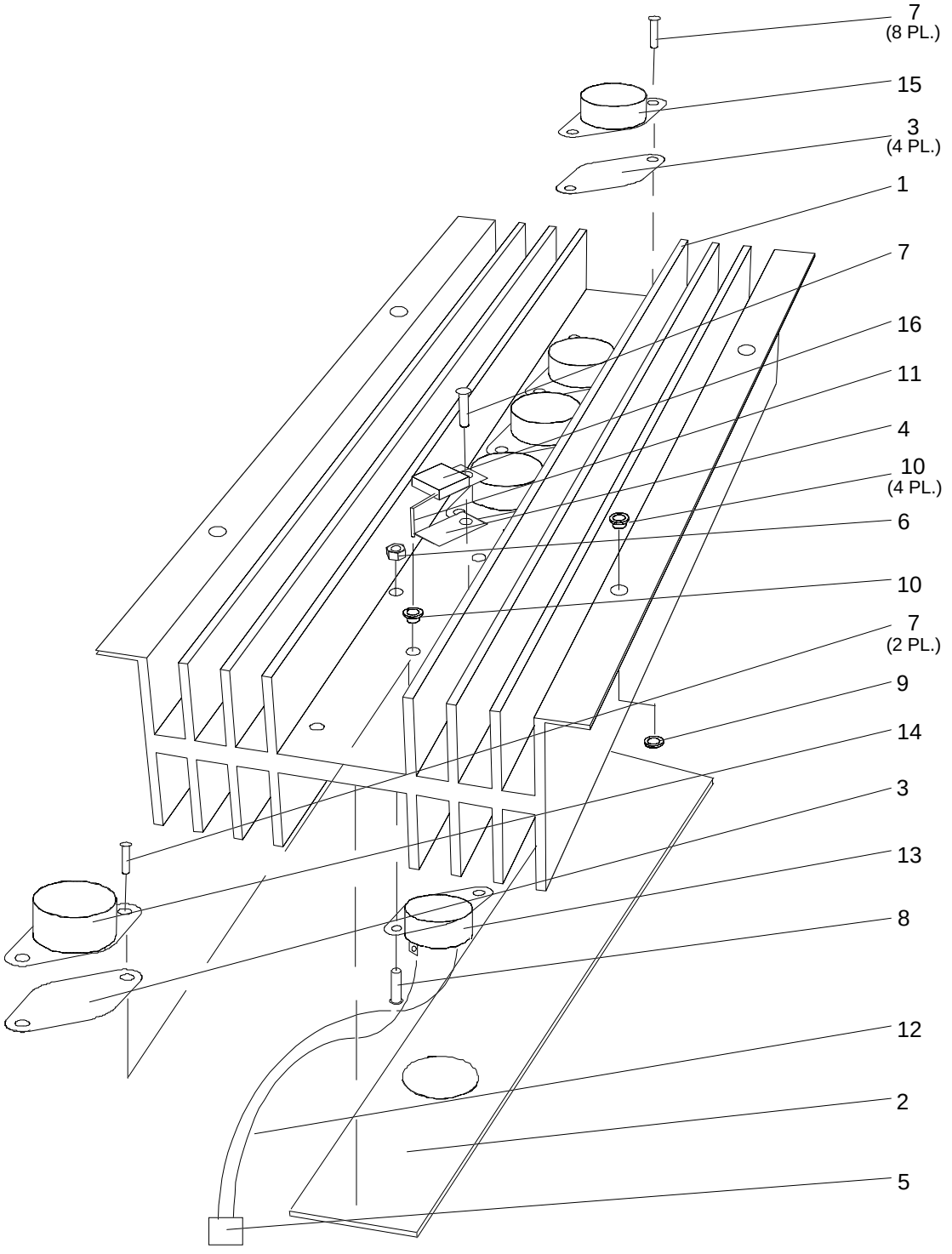
NO.	PART NO.	QTY	DESCRIPTION
1	52.6243.0001	1 EA	CONN PLUG, MNLOK 6 POS
2	52.6358.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 3 PIN
3	52.6424.0001	1 EA	COVER, STRAIN RELIEF, 3 POS, MTA 100
4	52.8206.0001	6 EA	CONTACT SCKT, 20 AWG TIN MNLOK (LOOSE)
5	52.8313.0001	3 EA	RCPT, FASTON 1/4” 18-14 AWG FLAG DBL CRP
6	73.7006.0001	17 IN	WIRE, 16 AWG 300V 80C BLK STRND UL1061
7	73.7007.0001	17 IN	WIRE, 16 AWG 300V 80C WHT STRND UL1061
8	73.7008.0001	17 IN	WIRE, 16 AWG 300V 80C GRN STRND UL1061
9	73.7018.0001	9 IN	WIRE, 22 AWG STRND RED
10	73.7031.0001	9 IN	WIRE, 22 AWG STRND BLACK
11	73.7052.0001	9 IN	WIRE, 22 AWG STRND WHITE



4.2.27 Assembly, APS Heat Sink 22.1036.1002

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0090	1 EA	HEATSINK, POWER SUPPLY, LAMP
2	24.9620.2148	1 EA	PCB ASSY, APS 400X SWITCH
3	51.5005.0001	5 EA	INSULATOR, TO-3
4	51.5006.0001	1 EA	INSULATOR, TO-220
5	52.6302-0001	1 EA	CONN HOUSING, MTA CLOSED END RED 2 PIN
6	53.2002.0001	2 EA	NUT, 6-32 KEP ZINC PLATED
7	53.6557.0001	11 EA	SCREW, 6-32 X 9/16” PPZ
8	53.6558.0001	2 EA	SCREW, 6-32 X 3/8” PPZ
9	55.6524.0001	4 EA	WASHER, FLAT #8 NYLON .174 ID .062” THK
10	55.6525.0001	5 EA	BUSHING, NYLON SHOULDER, #6x.170Dx.125L
11	73.7051.0003	1 IN	WIRE, 18 AWG BUSS
12	73.7062.0001	12 IN	WIRE, 22 AWG STRND VIOLET
13	74.1006.0002	1 EA	SWITCH, THERMAL (OPEN 200F/CLOSE 170F)
14	80.1610.0450	1 EA	TRANSISTOR, IRF450 NCH 500V 13A TO3
15	80.1612.1005	4 EA	TRANSISTOR, MJ10005 NPN 400V 20A TO3
16	82.4305.1550	1 EA	DIODE, ULTRAFAST, MUR1550 600V 15A

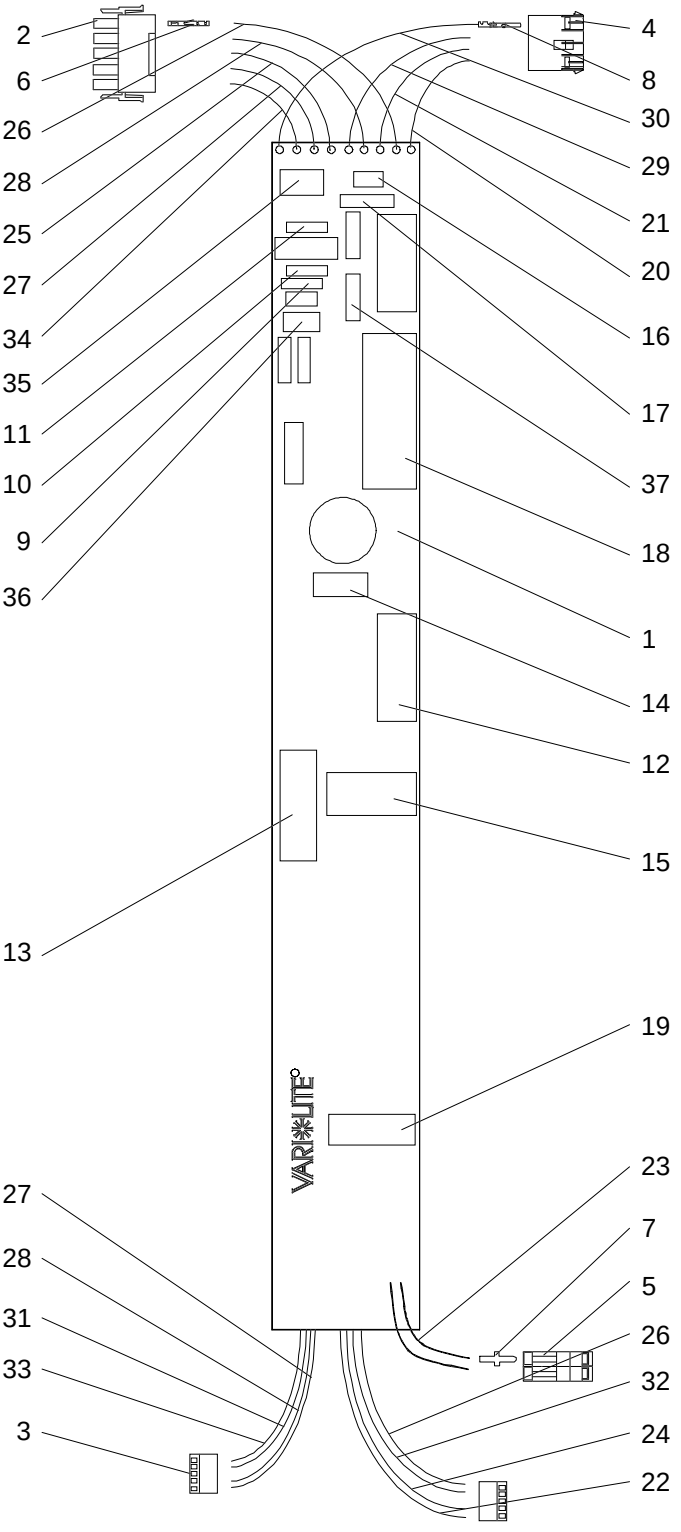
Assembly, APS Heat Sink (continued)
22.1036.1002



4.2.28 PCB Assembly, APS 400X Switch 24.9620.2148

NO.	PART NO.	QTY	DESCRIPTION
1	11.9620.0148	1 EA	PCB, APS SWITCH
	51.5003.0001	6 EA	SOCKET, TO-3 PC/HEATSINK (NOT SHOWN)
2	52.6237.0001	1 EA	CONN PLUG, MNLOK 5 POS
3	52.6270.0001	2 EA	CONN HOUSING, MTA CLOSED END RED 5 PIN
4	52.6320.0001	1 EA	CAP HOUSING, MNLOK 4 POS
5	52.6362.0001	2 EA	CONN HOUSING, 30 SERIES RED
6	52.8256.0001	5 EA	CONTACT SOKT, 20 AWG TIN MNLOK (LOOSE)
7	52.8247.0002	2 EA	CRIMP CONTACT, S30 TIN (LOOSE)
8	52.8258.0001	4 EA	CONTACT PIN, 20-14 AWG MNLOK (LOOSE)
	55.2186.0001	3 EA	CABLE, TIE, SMALL, .10 X 4” (NOT SHOWN)
9	60.1422.1001	1 EA	RES, 1/4W 5% 1K CF
10	60.1422.3301	1 EA	RES, 1/4W 5% 3.3K CF
11	60.1424.1005	1 EA	RES, 1/4W 5% 10K CF
12	60.7242.0501	2 EA	RES, 5W 1% .05 WW
13	60.7442.1007	1 EA	RES, 5W 5% 10 OHMS WW
14	62.2005.0001	3 EA	CAP, .01UF, 630V, RAD, POLYEST, .400”, 10%
15	62.2012.0104	1 EA	CAP, .1UF, 400V, RAD, POLYEST, .580”, 10%
16	62.2047.0001	2 EA	CAP, .OO1UF, 1000V, RAD, CERAMIC, .250”, 20%
17	62.2047.0022	1 EA	CAP, .0022UF, 1000V, AXL, CERAMIC, .295”, 5%
18	62.2049.0105	1 EA	CAP, 1UF, 400V, AXL, POLYPRO, 1.500”, 10%
19	62.2070.0022	1 EA	CAP, .022UF, 1000V, RAD, POLYEST, .550”, 10%
20	73.7006.0001	4 IN	WIRE, 16 AWG 300V 80C BLK STRND UL1061
21	73.7012.0001	4 IN	WIRE, 16 AWG 300V 80C RED STRND UL1061
22	73.7018.0001	7 IN	WIRE, 22 AWG STRND RED
23	73.7027.0001	14 IN	WIR, 16 AWG 30KV CHAMPLAIN ONLY 3239B
24	73.7029.0001	7 IN	WIRE, 22 AWG STRND ORANGE
25	73.7030.0001	5 IN	WIRE, 22 AWG STRND GRAY
26	73.7031.0001	14 IN	WIRE, 22 AWG STRND BLACK
27	73.7032.0001	12 IN	WIRE, 22 AWG STRND BROWN
28	73.7033.0001	12 IN	WIRE, 22 AWG STRND BLUE
29	73.7042.0001	4 IN	WIRE, 16 AWG 300V 80C YEL STRND UL1061
30	73.7043.0001	4 IN	WIRE, 16 AWG 300V 80C VIO STRND UL1061
31	73.7046.0001	11 IN	WIRE, 22 AWG STRND GREEN
32	73.7052.0001	9 IN	WIRE, 22 AWG STRND WHITE
33	73.7059.0001	11 IN	WIRE, 22 AWG STRND YELLOW
34	73.7062.0001	5 IN	WIRE, 22 AWG STRND VIOLET
35	82.4304.0856	1 EA	DIODE, FAST, MR856 600V 3A
36	82.4315.0106	1 EA	RECTIFIER, SILICON CONTROLLED C106
37	82.5301.6303	4 EA	DIODE, ZENER TS, 1.5KE200 200V 5W

PCB Assembly, APS 400X Switch (continued)
24.9620.2148



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4.2.29 PCB Assembly, APS 400X Control 24.9620.2146 (*VL2B*) 24.9634.0057 (*VL2C*)

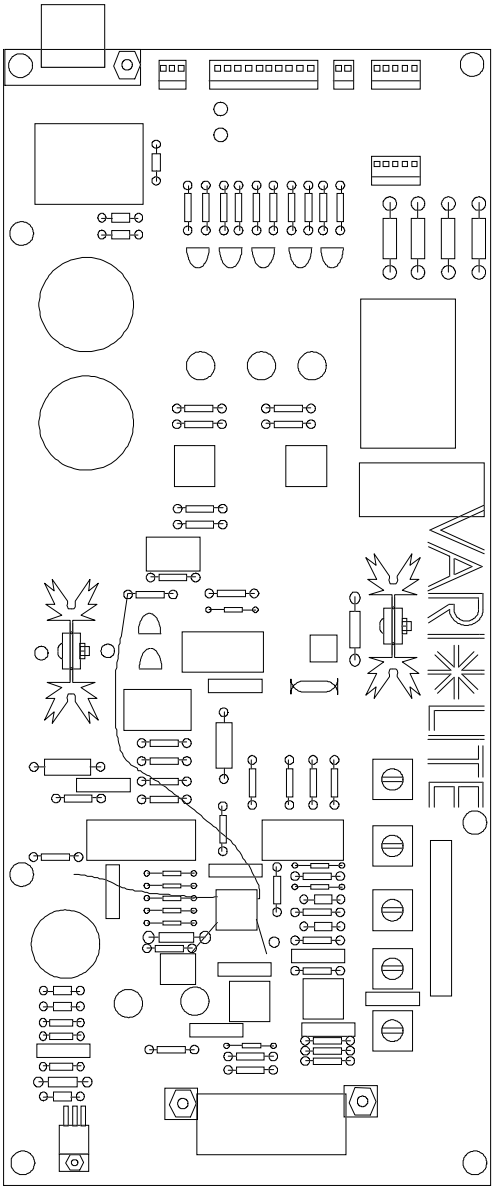
PART NO.	QTY	REF DES	DESCRIPTION
11.9620.0146	1 EA		PCB, APS CONTROL CARD
24.9621.0172	1 EA	IC2	PCB ASSY, EMULATOR, MC1494
50.2708.0001	4 EA	XIC3, 4, 6, 7	SOCKET, 8 PIN DIP
50.2714.0001	1 EA	XIC5	SOCKET, 14 PIN DIP
50.2716.0001	1 EA	XIC2	SOCKET, 16 PIN DIP (**VL2B ONLY**)
50.2718.0001	1 EA	XIC2	SOCKET, 18 PIN DIP
51.5001.0001	2 EA		HEATSINK, TO-220 1” W/PINS
51.5006.0001	4 EA		INSULATOR, TO-220
51.5011.0002	5 EA		MOUNTING PAD, LED
52.6229.0001	1 EA	P5	HEADER, MTA FRIC LOK STRT POST 3 PIN
52.6258.0001	1 EA	P7	HEADER, MNLOK RT ANGL 5 PIN
52.6259.0001	2 EA	P1, 2	HEADER, MTA FRCT LOK STRT POST 5 PIN
52.6297.0001	1 EA	P3	HEADER, MTA FRCT LOK STRT POST 2 PIN
52.6356.0001	1 EA	P6	HEADER, MNLOK RT ANGL 2 PIN
52.6357.0001	1 EA	P4	HEADER, MTA FRCT LOK STRT POST 10 PIN
53.2002.0001	3 EA		NUT, 6-32 KEP ZINC PLATED
53.2003.0001	1 EA		NUT, 4-40, KEP ZINC PLATED
53.2016.0001	2 EA		NUT, 4-40 SML PATTERN
53.6525.0001	3 EA		SCREW, 6-32 X 5/16” PPZ
53.6529.0001	1 EA		CLIP, MOUNTING DRIVE
53.6596.0001	2 EA		SCREW, 4-40 X 5/16” PPZ
55.2199.0002	2 IN	T3	HEATSHRINK, 1/16” CLEAR
55.2203.0001	1 EA		SCREW, 4-40 X ¼” PPZ
55.6509.0001	4 EA		WASHER, SHOULDER (HEATSINK)
55.6688.0001	1 EA		WASHER, MYLAR .558 OD X .305 ID X .008 THK
60.1420.1203	1 EA	R42	RES, 1/4W 5% 1.2K CF
60.1420.3302	2 EA	R23, 34	RES, 1/4W 5% 33K CF
60.1420.8203	1 EA	R24	RES, 1/4W 5% 8.2K CF
60.1421.2201	1 EA	R51	RES, 1/4W 5% 22 OHM CF
60.1421.4701	10 EA	R1-10	RES, 1/4W 5% 4.7K CF
60.1421.4702	1 EA	R37	RES, 1/4W 5% 47K CF
60.1421.6202	1 EA	R40	RES, 1/4W 5% 62K OHM CF (**VL2B ONLY**)
60.1421.6802	1 EA	R33	RES, 1/4W 5% 68K CF
60.1422.1001	9 EA	R11-15, 27, 28, 32, 43	RES, 1/4W 5% 1K CF
60.1422.2202	3 EA	R18, 21, 41	RES, 1/4W 5% 22K CF
60.1422.3301	2 EA	R29, 50	RES, 1/4W 5% 3.3K CF
60.1423.1004	1 EA	R52	RES, 1/4W 5% 1MEG CF
60.1423.4702	1 EA	R44	RES, 1/4W 5% 47 CF
60.1424.1005	3 EA	R19, 20, 26	RES, 1/4W 5% 10K CF
60.1424.1502	2 EA	R22, 38	RES, 1/4W 5% 15K CF (**R22 VL2B ONLY**)
60.1424.3002	2 EA	R22, 40	RES, 1/4W 5% 30K CF (**VL2C ONLY**)
60.1426.1503	1 EA	R17	RES, 1/4W 5% 150K CF
60.1426.2203	1 EA	R35	RES, 1/4W 5% 220K CF
60.1426.4703	1 EA	R16	RES, 1/4W 5% 470K CF
60.1426.5603	1 EA	R39	RES, 1/4W 5% 560K CF

PCB Assembly, APS 400X Control (continued)
24.9620.2146 (*VL2B*)
24.9634.0057 (*VL2C*)

PART NO.	QTY	REF DES	DESCRIPTION
60.1429.3303	2 EA	R25, 30	RES, 1/4W 5% 330 CF
60.1430.5602	1 EA	R36	RES, 1/4W 5%56K CF
60.2432.3902	1 EA	R49	RES, 1/2W 5% 39 CF
60.3430.1003	1 EA	R31	RES, 1W 5% 1K MET OXIDE
60.3430.1004	4 EA	R45-48	RES, 1W 5% 10 OHM MET OXIDE
62.2005.0001	4 EA	C4, 11, 22, 25	CAP, .01UF, 630V, RAD, POLEST, .400", 10%
62.2010.0001	1 EA	C24	CAP, .1UF, 100V, RAD, POLYEST, .297", 5%
62.2016.0104	5 EA	C1-3, 5, 9	CAP, .1UF, 100V, RAD, POLYEST, .300", 10%
62.2025.0272	2 EA	C18, 19	CAP, 2700UF, 35V, RAD, ALUMNUM, 1.180", REF
62.2027.0475	4 EA	C14-17	CAP, 4.7UF, 35V, RAD, TANTALM, .125", 10%
62.2042.0105	1 EA	C10	CAP, 1UF, 35V, RAD, TANTALM, .125", 10%
62.2043.0107	1 EA	C7	CAP, 100UF, 25V, AXL, ALUMNUM, .630", 20%
62.2043.0107	1 EA		CAP, 100UF, 25V, AXL, ALUMNUM, .630", 20%
62.2045.0106	2 EA	C6,23	CAP, 10UF, 63V, AXL, ALUMNUM, .472", 20%
62.2046.0001	2 EA	C20, 21	CAP, .001UF, 1000V, RAD, POLYEST, .400", 5%
62.2048.0101	1 EA	C12	CAP, 100PF, 500V, RAD, CERAMIC, .234", 5%
62.2050.0001	1 EA		CAP, .01UF, 630V, RAD, POLYEST, .400", 5% (**VL2C ONLY**)
62.2083.0108	1 EA	C13	CAP, 1000UF, 35V, AXL, ALUMNUM, 1.240", 20%
63.2004.0001	1 EA	TR1	POT, .5K, LIN, 1TRN, HORIZ MNT, 10%
63.2005.0001	2 EA	TR4, 5	POT, 20K, LIN, 1TRN, HORIZ MNT, 10%
63.2010.0001	1 EA	TR2	POT, 5K, LIN, 1TRN, HORIZ MNT, 10%
63.2011.0001	1 EA	TR3	POT, 250K, LIN, 1TRN, HORIZ MNT, 10%
66.4502.0001	1 EA	K1	RELAY, 4PDT, 5A, 12VDC, PC MNT, SEALED
68.4507.0001	2 EA	T1	CORE, DRIVE
68.4571.0001	1 EA	T1	BOBBIN, WOUD, GATE DRIVE
68.4521.0001	1 EA	T2	TRANSFORMER, 400HZ, 1PRI/4SEC
68.4525.0002	1 EA	T3	TRANSFORMER, PULSE 2:1:1
73.7056.0003	4 IN	T3	WIRE, 24 AWG STRAND ORANGE (VL1)
73.7056.0004	2 IN	T3	WIRE, 24 AWG STRAND YELLOW
80.1512.0112	1 EA	Q9	TRANSISTOR, TIP112 NPN 100V 2A TO220
80.1513.0117	2 EA	Q10, 17	TRANSISTOR, TIP117 PNP 100V 2A TO220
80.2513.0005	6 EA	Q1-6	TRANSISTOR, MPSA05 NPN 60V 500mA TO92
80.2513.0055	1 EA	Q7	TRANSISTOR, MPSA55 PNP 60V 500mA TO92
80.2513.9123	1 EA	Q8	TRANSISTOR, IRFD9123 PCH 60V 800mA DIP4
82.4307.4002	3 EA	D12-14	DIODE, RECTIFIER, 1N4002 100V 1 A
82.4310.5817	2 EA	D3, 4	DIODE, RECTIFIER 1N5817 20V 1A
82.4312.0105	3 EA	D6-8	DIODE, FAST, MUR105/110 50V 1A
82.4316.5818	4 EA	D16-19	DIODE, RECTIFIER, 1N5818 30V 1A (**VL2B ONLY**)
82.4317.5819	4 EA	D16-19	DIODE, RECTIFIER, 1N5819 40V 1A (**VL2C ONLY**)
82.5302.4148	5 EA	D1, 2, 5, 9, 15	DIODE, ULRAFAST, 1N4148 100V 10mA
82.5305.5347	1 EA	Z7	DIODE, ZENER, 1N5347 10V 5W
83.3108.0001	1 EA	IC3	IC, TL072 DUAL BIFET OP AMP
83.3109.0001	1 EA	IC5	IC, 14024 SEVEN STAGE RIPPLE COUNTER
83.3116.0001	1 EA	IC4	IC, 3425 OVER/UNDER SENSING CKT

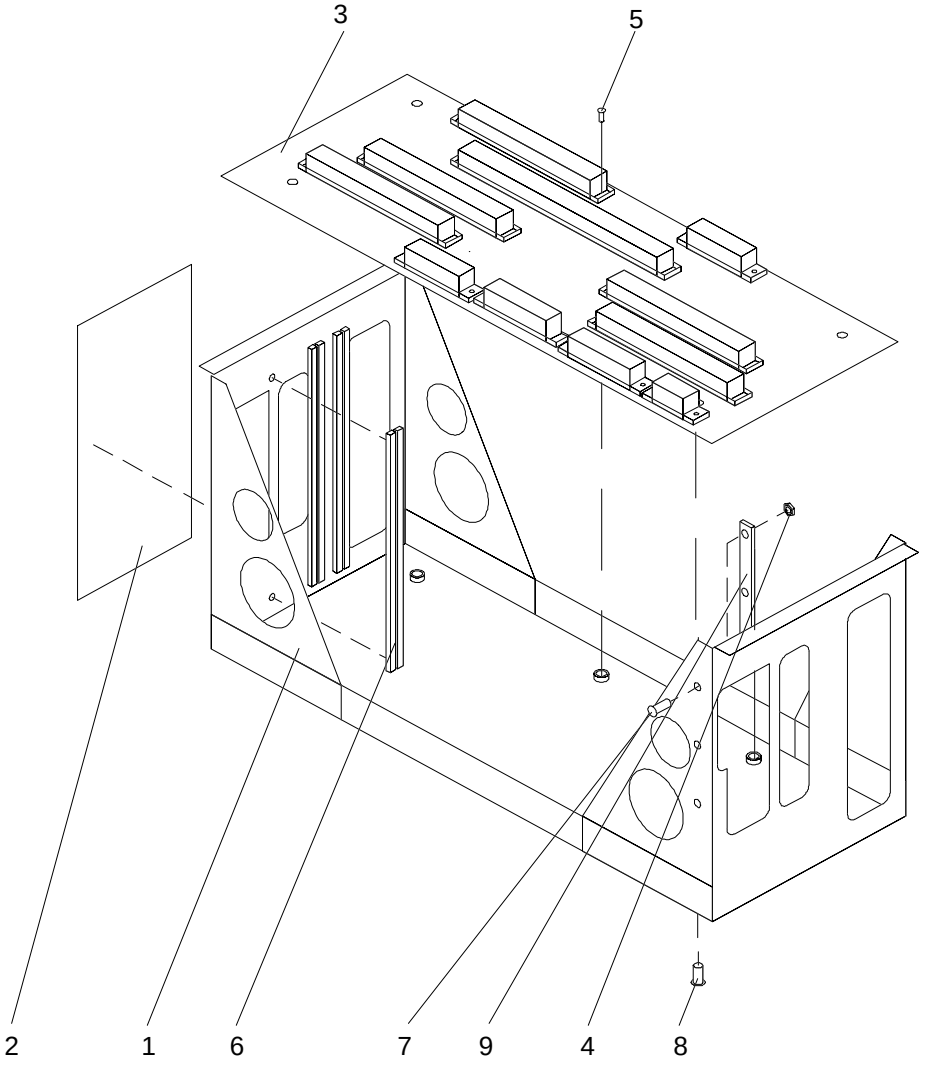
PCB Assembly, APS Control (continued)
24.9620.2146 (*VL2B*) APS 400X
24.9634.0057 (*VL2C*) APS 600X

PART NO.	QTY	REF DES	DESCRIPTION
83.3127.0001	1 EA	IC9	REGUL, LM79M15 VOLT REG -15V 500mA
83.3136.0001	1 EA	IC8	IC, 78M15 VOLT REG +15V 500mA
83.3149.0002	1 EA	IC1	IC, SG3526N PULSE WIDTH MODULATOR
86.6106.0001	2 EA	IC6, 7	IC, ILCT6 DUAL OPTOCOUPLER
88.8101.0001	2 EA	LED1, 5	LED, RED HP
88.8102.0001	1 EA	LED4	LED, YELLOW HP
88.8103.0001	2 EA	LED2, 3	LED, GREEN HP



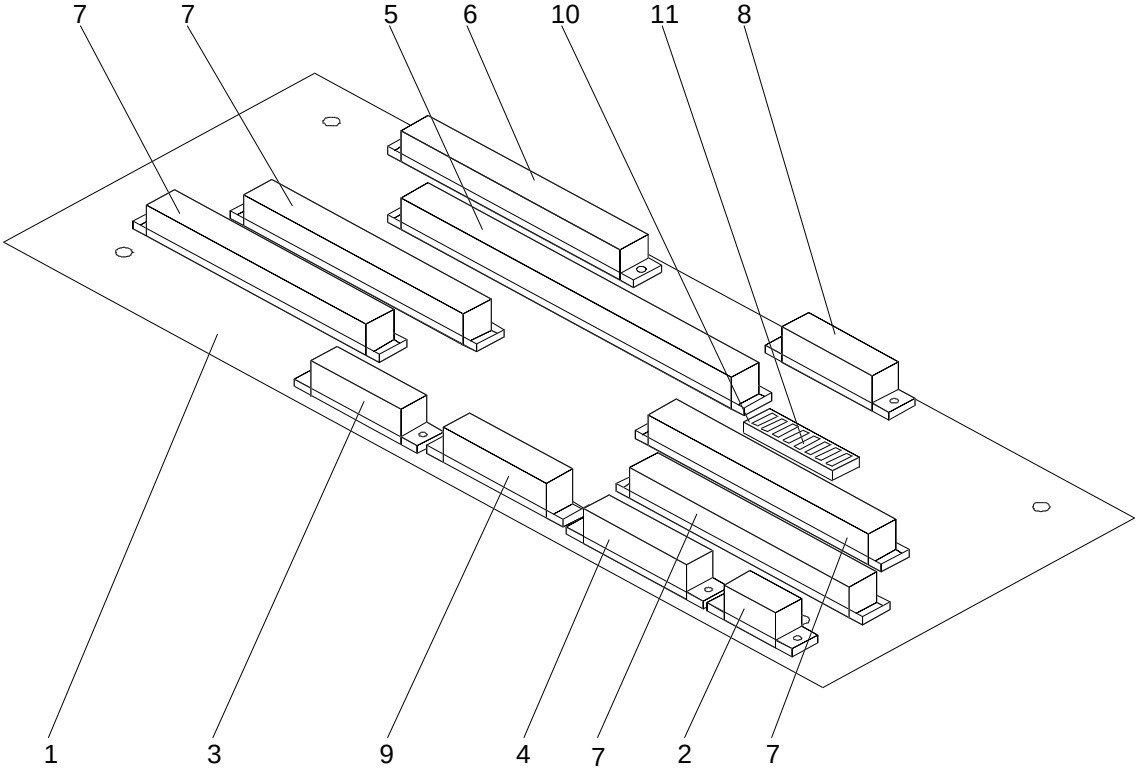
4.2.30 Assembly, Electronic Card Cage 22.1007.0001 (*VL2B*) 22.9637.0010 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0023	1 EA	CARD CAGE, ELECRONICS
2	10.9637.0014	1 EA	AIR BLOCK, CARD CAGE (**VL2C ONLY**)
3	24.9620.0024	1 EA	PCB ASSY, MOTHER BOARD
4	53.2003.0001	3 EA	NUT, 4-40, KEP ZINC PLATED
5	53.6596.0001	20 EA	SCREW, 4-40 X 5/16” PPZ
6	55.2102.0001	6 EA	CARD GUIDE, NYLON 4”
7	55.2201.0001	3 EA	SCREW, 4-40 X 5/16” PFB
8	55.2203.0001	2 EA	SCREW, 4-40 X 1/4” PPZ
9	55.6611.0001	1 EA	PLATE, CBL TIE MOUNTING 3 POS



4.2.31 PCB Assembly, Mother Board 24.9620.0024

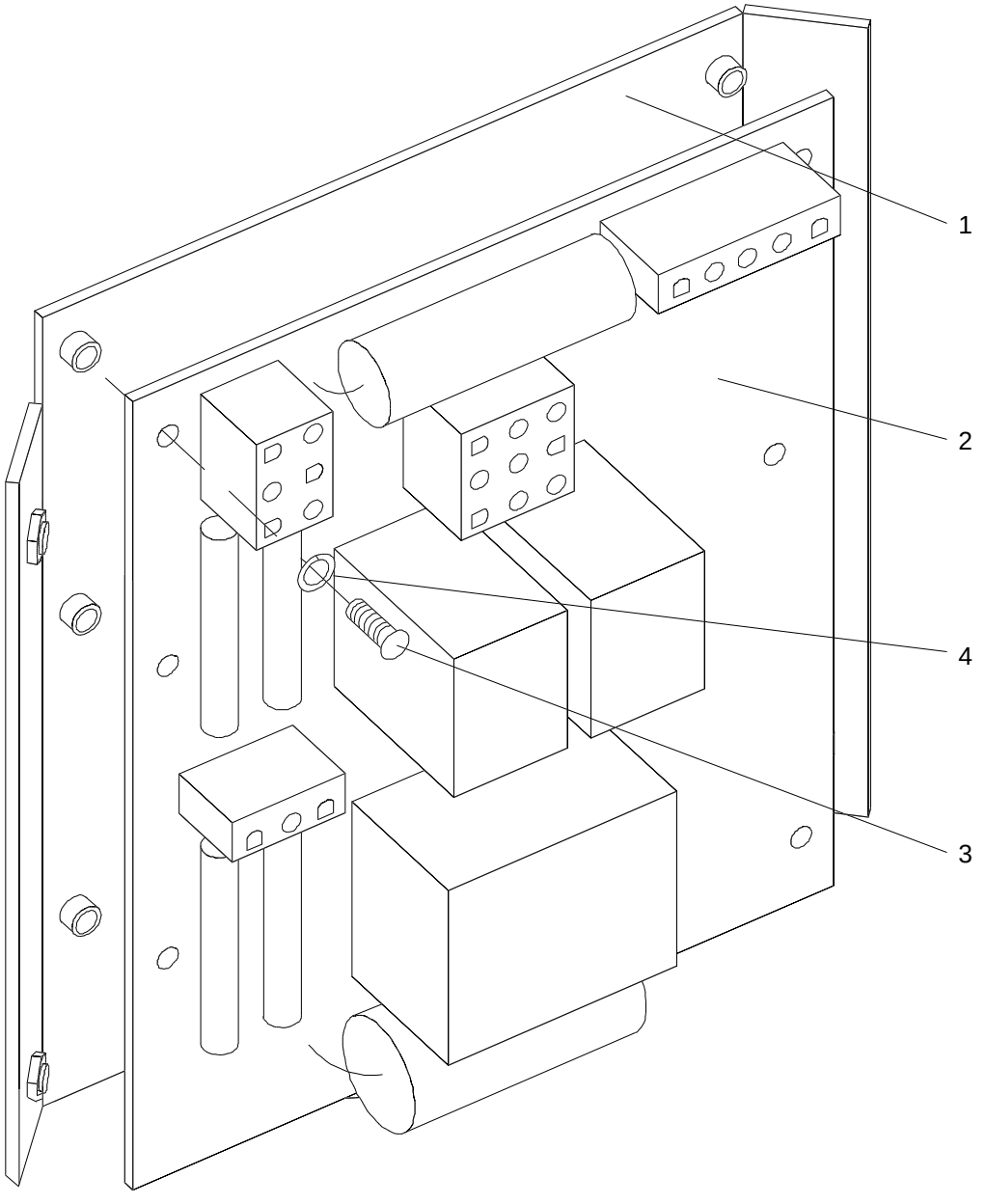
NO.	PART NO.	QTY	DESCRIPTION
1	11.9620.0024	1 EA	PCB, MOTHER BOARD
2	52.6204.0001	1 EA	HEADER ASSY, SHROUDED DBL ROW 10 PIN
3	52.6210.0001	1 EA	HEADER ASSY, SHROUDED BCL ROW 18 PIN
4	52.6225.0001	1 EA	HEADER ASSY, SHROUDED BCL ROW 26 PIN
5	52.6233.0001	1 EA	CONN, EURO 32 POS SCKT TYPE B
6	52.6241.0001	1 EA	HEADER, MM INLINE STRT PC MT 6 PIN
7	52.6247.0001	4 EA	CONN, EURO 64 POS SCKT TYPE C
8	52.6345.0001	1 EA	HEADER ASSY, SHROUDED DBL ROW 20 PIN
9	52.6364.0001	1 EA	HEADER ASSY, SHROUDED DBL ROW 24 PIN
10	74.1001.0001	1 EA	COVER, DIP SWITCH
11	74.1002.0001	1 EA	SWITCH, DIP 8 POLE



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4.2.32 Assembly, AC Control 22.1008.0001

NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0097	1 EA	MOUNT, PCB, AC CONTROL
2	24.9620.0077	1 EA	PCB ASSY, AC VOLTAGE SELECTOR (VSB)
3	53.6596.0001	8 EA	SCREW, 4-40 X 5/16” PPZ
4	55.6512.0001	8 EA	WASHER, SPLIT LOCK #4

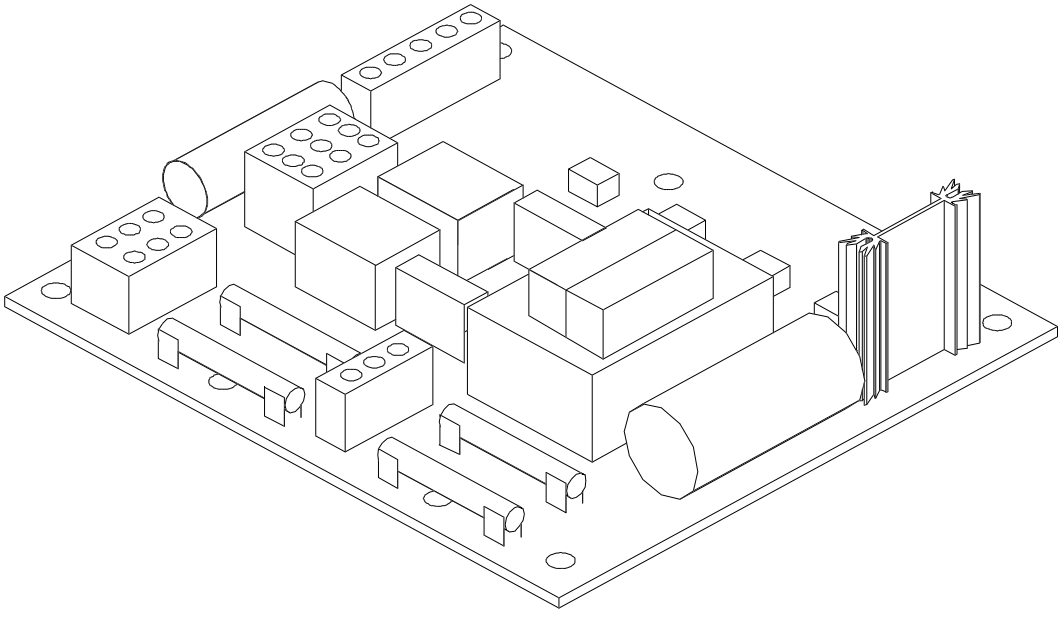


4.2.33 PCB Assembly, AC Voltage Selector (VSB) 24.9620.0077

PART NO.	QTY	REF DES	DESCRIPTION
04.4017.0015	1 EA		LABEL, “15A”
11.9620.0077	1 EA		PCB, AC VOLTAGE SELECTOR
50.2706.0001	1 EA	U1	SOCKET, 6 PIN DIP
50.2708.0001	4 EA	U2, 3, 4, 5	SOCKET, 8 PIN DIP
51.5001.0001	1 EA		HEATSINK, TO-220 1” W/PINS
51.5006.0001	1 EA		INSULATOR, TO-220
52.6230.0001	1 EA		PIN HEADER ASSY, MNLOK MALE 3 CIR
52.6236.0001	1 EA	J4	HEADER, MNLOK PIN 5 PIN
52.6240.0001	1 EA	J5	HEADER, MTA FRCT LOK STRT POST 6 PIN
52.6242.0001	1 EA	J1	PIN HEADER ASSY, MNLOK 6 CIR
52.6249.0001	1 EA	J3	PIN HEADER ASSY, MNLOK PCB 9 CIR
53.2003.0001	3 EA		NUT, 4-40, KEP ZINC PLEATED
53.6581.0001	2 EA		SCREW, 4-40 X 1 3/8” PPZ
53.6596.0001	1 EA		SCREW, 4-40 X 5/16” PPZ
53.6597.0001	8 EA		SCREW, 4-40 X 3/16” PPZ
53.6600.0001	8 EA		SCREW, 4-40 X 5/16” PPB
55.2204.0001	2 EA		WASHER, NYLON #4
55.6509.0001	1 EA		WASHER, SHOULDER (HEATSINK)
55.6691.0001	2 EA	BR1, 2	PAD, MNTG RECTIFIER BRIDGE (VL4)
60.1223.8878	2 EA	R20, 22	RES, 1/4W 1% 88.7K CF
60.1230.1373	1 EA	R15	RES, 1/4W 1% 1.37K MF
60.1230.2103	1 EA	R17	RES, 1/4W 1% 2.10K MF
60.1231.2741	1 EA	R11	RES, 1/4W 1% 2.74K CF
60.1231.4321	1 EA	R13	RES, 1/4W 1% 4.32K CF
60.1421.4701	4 EA	R5, 9, 24, 27	RES, 1/4W 5% 4.7K CF
60.1422.1001	1 EA	R36	RES, 1/4W 5% 1K CF
60.1422.2202	1 EA	R31	RES, 1/4W 5% 22K CF
60.1423.1004	2 EA	R29, 30	RES, 1/4W 5% 1MEG CF
60.1424.1005	11 EA	R6, 8, 18, 19, 21, 25, 26, 32-35	RES, 1/4W 5% 10K CF
60.1424.4703	2 EA	R4,7	RES, 1/4W 5% 470 CF
60.1428.1203	1 EA	R23	RES, 1/4W 5% 120 CF
60.1429.1503	1 EA	R28	RES, 1/4W 5% 150 CF
60.2210.2005	4 EA		RES 1/2W 1% 200K CC (VL1)
60.3530.1002	3 EA	R1, 2, 3	RES, 1W 5% 100 OHM MF FLAME-PROOF
62.2005.0001	2 EA	C5, 6	CAP, .01UF, 630V, RAD, POLYEST, 400”, 10%
62.2012.0104	4 EA	C1, 2, 3, 4	CAP, .1UF, 400V, RAD, POLYEST, .580”, 10%
62.2017.0105	4 EA	C8, 9, 10, 11	CAP, 1.0UF, 50V, RAD, TANTALM, .125”, 10%
62.2018.0132	1 EA	C7	CAP, 1300UF, 50V, AXL, ALUMNUM, 1.641”, REF
62.2027.0475	2 EA	C12, 13	CAP, 4.7UF, 35V, RAD, TANTALM, .125”, 10%
62.2029.0505	1 EA	C14	CAP, 5UF, 200V, AXL, POLYEST, .062”, 10%
62.2058.0474	1 EA	AP:R15	CAP, .47UF, 50V, RAD, CERAMIC, .200”, 20%
63.2001.0001	1 EA	VAR1	VARIS, MET-OX, 250V, 10A, RAD
63.2002.0001	1 EA	VAR2	VARIS, MET-OX, 250V, 50A, RAD
66.4501.0001	1 EA	K3	RELAY, DPDT, 2A, 5VDC, PC MNT, SEALED
66.4502.0001	2 EA	K1, 2	RELAY, 4PDT, 5A, 12 VDC, PC MNT, SEALED

PCB Assembly, AC Voltage Selector (VSB) (continued)
24.9620.0077

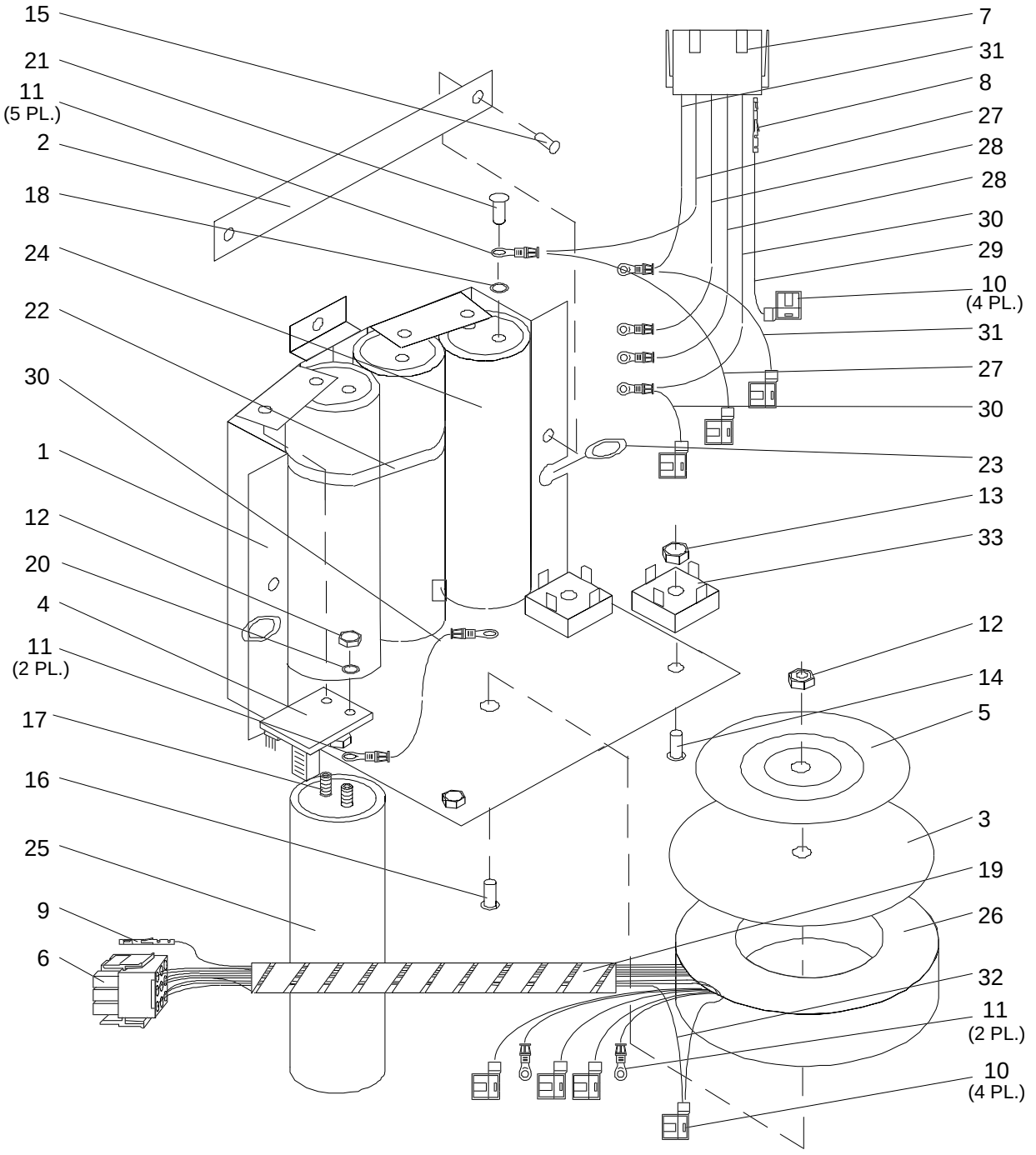
PART NO.	QTY	REF DES	DESCRIPTION
68.4504.0001	1 EA	T1	XFMR, 5.6 VA, 2 PRI, 2 SEC, AC SLCT BD
70.3702.0001	2 EA	F3, 4	FUSE, 3A 250V, .25 X .25", SLO-BLO
70.3703.0001	8 EA		FUSEHOLDER, PC MT, 3.0MM X 3.3MM, 2 REQ'D
70.3750.0015	2 EA	F1, 2	FUSE, 15A, 250V, 3AB FAST CERAMIC .25 X 1.25"
80.2513.0005	4 EA	Q3-6	TRANSISTOR, MPSA05 MPN 60V 500mA TO92
80.2513.0055	2 EA	Q1, 2	TRANSISTOR, MPSA55 PNP 60V 500mA YO92
82.4302.0004	2 EA	BRI1, 2	BRIDGE RECTIFIER, W06G 600V 1.5A
82.4307.4002	3 EA	CR1, 2, 7	DIODE, RECTIFIER, 1N4002 100V 1A
82.5302.4148	6 EA	CR3-6, 8, 9	DIODE, ULTRAFAST, 1N4148 100V 10mA
83.3103.0001	1 EA	REG1	IC, LM317T ADJ POS VOLT REGULATOR
83.3106.0001	1 EA	U1	IC, MOC3031 OPTOCOUPLER, TRIAC OUTPUT
83.3116.0001	2 EA	U4	IC, 3425 OVER/UNDER SENSING CKT
83.3117.0001	1 EA	U3	IC, LM393 DUAL COMPARATOR
86.6101.0001	1 EA	U2	IC, ILCT6 DUAL OPTOCOUPLER



4.2.34 Assembly, Transformer 22.1009.0001

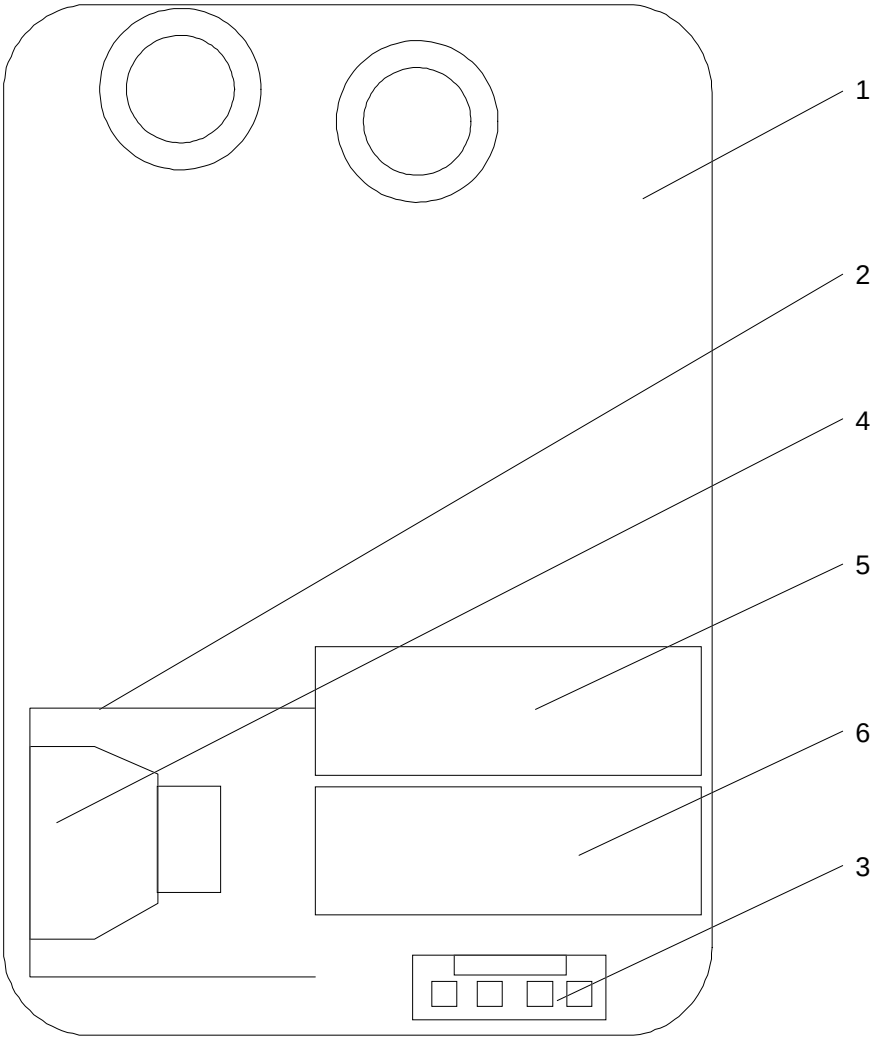
NO.	PART NO.	QTY	DESCRIPTION
1	10.9620.0111	1 EA	BRACKET, TRANSFORMER
2	10.9620.0156	1 EA	STRAP, BRACKET, TRANSFORMER
3	10.9620.0158	2 EA	PAD, POWER TRANSFORMER, LAMP
4	24.9623.0194	1 EA	PCB ASSY, DC-DC CONVERTER
5	46.6004.0001	1 EA	MOUNTING DISC, METAL 90MM DIA
6	52.6252.0001	1 EA	PLUG HOUSING, MNLOK 9 PIN
7	52.6254.0001	1 EA	PLUG, MM INLINE 6 PIN (XRORMER)
8	52.8205.0002	6 EA	SOCKET, TIN 16 AWG CLRIMP (LOOSE) TYPE 3+
9	52.8256.0001	9 EA	SOCKET, TIN 20-14 AWG (LOOSE) MNLOK
10	52.8244.0002	8 EA	FASTON RECEPT FLAG, .250 16-14 AWG (LOOSE)
11	52.8232.0001	9 EA	TERM, RING #10 16-14 AWG INS (LOOSE)
12	53.2001.0001	1 EA	NUT, 10-32, KEPS ZINC PLATED
13	53.2004.0001	2 EA	NUT, 8-32, KEP
14	53.6535.0001	2 EA	SCREW, 8-32 X 7/8” PPB
15	53.6558.0001	2 EA	SCREW, 6-32 X 3/8” PPZ
16	53.6563.0004	1 EA	SCREW, 10-32 X 2 1/4” PPZ
17	53.6667.0002	2 EA	SCREW, 10-32 X 3/4” SS SET OVAL TIP
18	55.2114.0001	8 EA	WASHER, LCK INT TTH #10
19	55.2180.0002	24 IN	SPIRAL WRAP, 3/8” OD TEFLON
	55.2183.0001	5 IN	HEAT SHRINK, BLACK 1/2” (NOT SHOWN)
	55.2186.0001	13 EA	CABLE TIE, SMALL .10X4” (NOT SHOWN)
20	55.3301.0010	2 EA	WASHER, FLAT #10
21	55.6564.0001	8 EA	SCREW, 10-32 X 5/16” PPZ
22	55.6580.0001	1 EA	CABLE TIE, LARGE .18 X 12”
23	55.6587.0001	2 EA	GROMET, RUBBER BLACK 3/8 X 1/2
24	62.2024.0233	2 EA	CAP, 23000UF, 40V, RAD, ALUMNUM, .500”, %
25	62.2030.0633	2 EA	CAP, 63000UF, 15V, RAD, ALUMNUM, .500”, %
26	68.4518.0001	1 EA	XFMR, 225 VA, 2 PRI, 3 SEC, VL2B MAIN
27	73.7006.0001	33 IN	WIRE, 16 AWG 300V 80C BLK SRND UL1061
28	73.7008.0001	52 IN	WIRE, 16 AWG 300V 80C GRN SRND UL1061
29	73.7009.0001	26 IN	WIRE, 16 AWG 300V 80C BRN SRND UL1061
30	73.7011.0001	37 IN	WIRE, 16 AWG 300V 80C ORG SRND UL1061
31	73.7012.0001	33 IN	WIRE, 16 AWG 300V 80C RED SRND UL1061
32	73.7038.0001	31 IN	WIRE, 18 AWG STRND YELLOW (73-3018-0004)
33	82.4301.9802	2 EA	BRIDGE RECTIFIER, MDA980-2 100V 12A

Assembly, Transformer (continued)
22.1009.0001



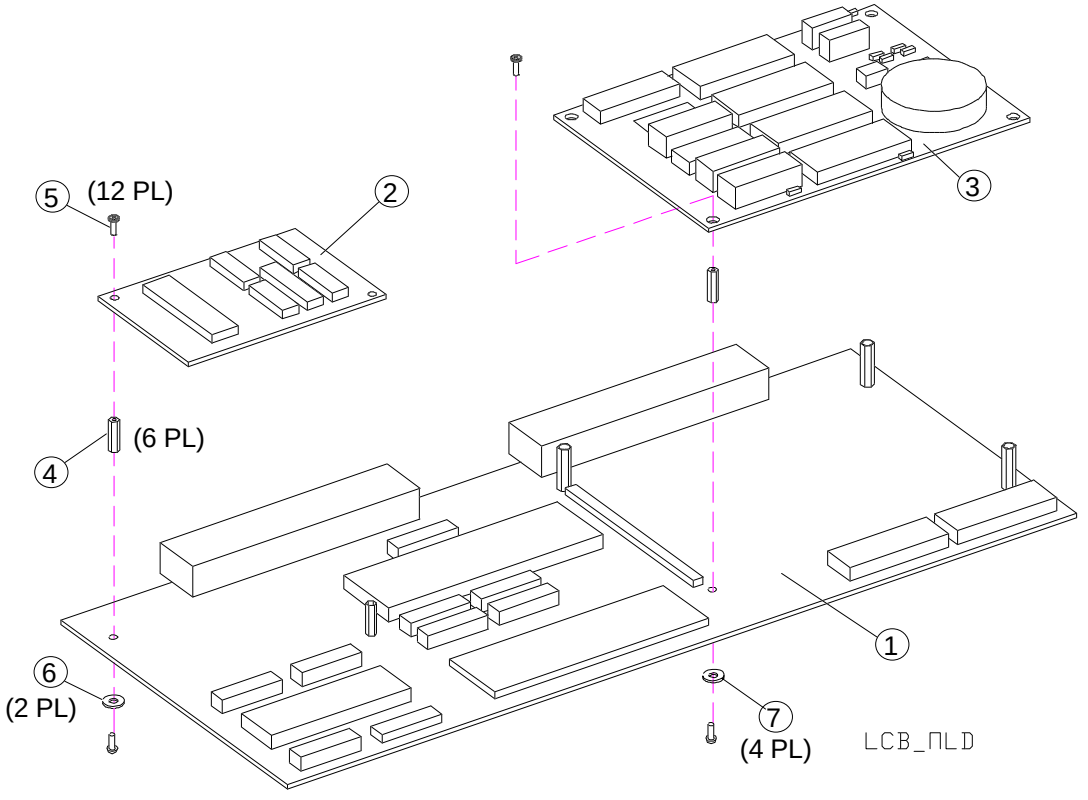
4.2.35 PCB Assembly, DC-DC Converter 24.9623.0194

NO.	PART NO.	QTY	DESCRIPTION
1	11.9623.0195	1 EA	PCB, DC-DC CONVERTER
2	51.5020.0001	1 EA	HEATSINK, 7136D, TO-220 VERT CLIP-ON
3	52.6284.0001	1 EA	HEADER, MTA FRCT LOK STRT POST 4 PIN
4	83.3138.0001	1 EA	IC, UA7805C VOLT REG +5V 1.5A
5	84.7411.0001	1 EA	IC, HPR100, DC TO DC CONVERTER, 5V IN/OUT
6	84.7411.0002	1 EA	IC, HPR102 DC-DC CONV 5V IN/15V OUT



4.2.36 Elec Assembly, LCB (*VL2B*) 21.9620.0013

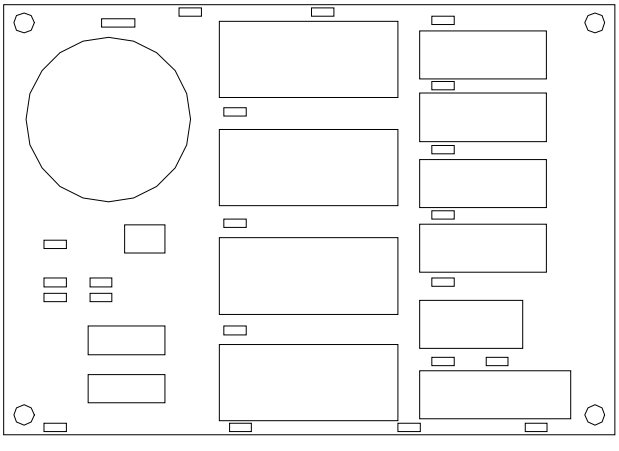
NO.	PART NO.	QTY	DESCRIPTION
1	24.9620.0013	1EA	PCB ASSY, LAMP CONTROL BOARD (LCB)
2	24.9620.0017	1 EA	PCB ASSY, VL2 MODEM
3	24.9620.0207	1 EA	PCB ASSY, VL2 MEMORY BOARD
4	55.2127.0001	6 EA	STANDOFF, 3/16” HEX 4-40 X 3/8”
5	55.2203.0001	12 EA	SCREW, 4-40 X 1/4” PPZ
6	55.2204.0001	2 EA	WASHER, NYLON #4
7	55.6512.0001	4 EA	WASHER, SPLIT LOCK #4



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4.2.37 Elec Assembly, VL2B Memory Board 21.9620.0207

PART NO.	QTY	REF DES	DESCRIPTION
11.9620.0207	1 EA		PCB, LAMP CONTROLLER MEMORY
50.2708.0001	1 EA	XU5	SOCKET, 8 PIN DIP
50.2714.0001	2 EA	XU9, 11	SOCKET, 14 PIN DIP
50.2716.0001	1 EA	XU10	SOCKET, 16 PIN DIP
50.2720.0001	4 EA	XU2, 3, 5, 8	SOCKET, 20 PIN DIP
50.2724.0002	1 EA	XU13	SOCKET, 24 PIN DIP
52.6238.0000	1 EA	P1	CONN STRIP, DBLE ROW 50
52.6399.0001	1 EA	JMP1	JUMPER, PROGRAMMING
52.6400.0001	1 EA	JMP1	HEADER, 3 PIN
60.1230.1005	1 EA	R5	RESISTOR, 1/4W 1% 100K MF
60.1230.2615	1 EA	R4	RESISTOR, 1/4W 1% 261K MF
60.1420.3301	1 EA	R3	RESISTOR, 1/4W 5% 3.3M CF
60.1421.2701	1 EA	R6	RESISTOR, 1.4W 5% 2.7M CF
60.1422.1001	3 EA	R1, 7, 8	RESISTOR, 1/4W 5% 1K CF
60.1424.1005	1 EA	R2	RESISTOR, 1/4W 5% 10K CF
61.4310.0103	2 EA	RP1, 2	RESISTOR SIP, 103 10 PIN BUSS
62.2010.0001	1 EA	C9	CAP, .1UF, 100V, RAD, POLYESTER .297” 5%
62.2013.0104	15 EA	C1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16	CAP, .1UF, 50V, AXL CERAMIC .100” 20%
65.5002.0001	1 EA	B1	BATTERY, LITHIUM 3.6VOL
82.4310.5817	2 EA	CR1, 3	DIODE, RECTIFIER, 1N5817
82.5302.4148	1 EA	CR2	DIODE, ULTRAFAST, 1N4148
83.3101.0001	1 EA		IC, ICL7665 VOLTAGE DETECTOR
84.4107.0002	4 EA	U1, 4, 7, 12	IC, UPD43256C-10L 32Kx8
84.4122.0001	2 EA	U2, 3	IC, 74ALS244 OCTAL TRI-STATE BUFFER
84.4124.0001	2 EA	U5, 8	IC, 74ALS245 OCTAL TRISTATE TRANSCEIVER
84.4131.0001	1 EA	U11	IC, 74HC05 HEX INVERTER
84.4133.0001	1 EA	U10	IC, 74HC138 3-TO-8 DECODER
84.4134.0001	1 EA	U9	IC, 74HC14 HEX INV. SCHMIDT TRIGGER



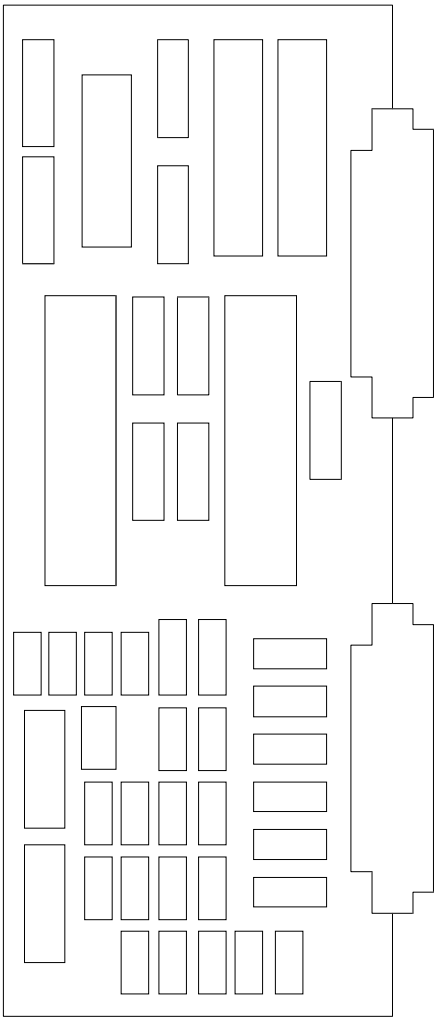
MEMPCB

4.2.38 PCB Assembly, LCB (*VL2B*) 24.9620.0013

PART NO.	QTY	REF DES	DESCRIPTION
11.9620.0013	1 EA		PCB, LAMP CONTROL
50.2714.0001	12 EA	XU9, 12, 25, 16, 27-29, 31, 32	SOCKET, 14 PIN DIP
50.2716.0001	6 EA	XU17-19, 26, 39, 42	SOCKET, 16 PIN DIP
50.2720.0001	16 EA	XU2-8, 13-15, 20-24 ,40	SOCKET, 20 PIN DIP
87.7135.0001	1 EA	U41	IC, PAL, 20K4ACNS, PROGRAMMED CMMD 1.1
50.2728.0001	2 EA	U43, 44	SOCKET, 28 PIN DIP
50.2740.0001	1 EA	U33	SOCKET, 40 PIN DIP
50.2748.0001	2 EA	U1, 10	SOCKET, 48 PIN DIP
50.2764.0001	2 EA	XU11, 34	SOCKET, 64 PIN DIP
52.6205.0001	1 EA	SO2B	CONN SOCKET STRIP, 10 PIN
52.6239.0001	1 EA	SO1	CONN SOCKET STRIP, 50 PIN
52.6246.0001	2 EA	P1, 2	CONN, EURO 64 PIN TYPE C RT ANGL
52.6250.0001	1 EA	SO2A	CONN SOCKET STRIP, 9 PIN
60.1421.4701	2 EA	R7, 10	RES, 1/4W 5% 4.7K CF
60.1422.1001	3 EA	R3, 4, 9	RES, 1/4W 5% 1K CF
60.1424.1005	2 EA	R5, 6	RES, 1/4W 5% 10K CF
60.1425.1003	1 EA	R2	RES, 1/4W 5% 100 OHMS CF
60.1425.2703	1 EA	R8	RES, 1/4W 5% 270 CF
60.1425.5603	1 EA	R1	RES, 1/4W 5% 560 OHM CF
61.4310.0472	18 EA	RP1-18	RES SIP, 472 10 PIN BUSSED LW PRFLE
62.2006.0001	1 EA	C11	CAP, .01UF, 250V, RAD, POLYEST, .300”, 5%
62.2013.0104	34 EA	C1-10, 12-35	CAP, .1UF, 50V, AXL, CERAMIC, .100”, 20%
64.4001.0001	1 EA	U36	OSCILLATOR MODULE, 16MHZ KX0-01
66.4504.0001	1 EA	U30	DELAY LINE, 200ns
80.2513.0005	1 EA	Q1	TRANSISTOR, MPSA05 NPN 60V 500Ma TO92
84.4103.0001	1 EA	U33	IC, AM9513A SYSTEM TIMING & CONTROL
84.4117.0001	2 EA	U22, 23	IC, 74ALS373 TRISTATE OCTAL D-FF
84.4117.0002	1 EA	U16	IC, 74ALS1035 HEX BUFFER W/OPEN COLLECTR
84.4118.0001	1 EA	U11	IC, MC68440P-8 DUAL DIR MEM ACCESS CTRLR
84.4118.0002	1 EA	U32	IC, 74ALS74 DUAL D FLIP FLOP
84.4119.0001	1 EA	U10	IC, 68230P-8 PARALLEL IFC/TIMER
84.4119.0002	1 EA	U37	IC, 74ALS11 TRIPLE 3-IN AND GATE
84.4120.0001	1 EA	U17	IC, 74ALS138 3-TO-8 DECODER
84.4120.0002	1 EA	U31	IC, 74AS1004 HEX DRIVER
84.4121.0001	1 EA	U29	IC, 74AS1032
84.4121.0002	1 EA	U38	IC, 74LS10 TRIPLE 3-IN NAND GATE
84.4122.0001	2 EA	U20, 21	IC, 74ALS244 OCTAL TRI-STATE BUFFER
84.4122.0002	2 EA	U9, 35	IC, 74AS1034 HEX DRIVER
84.4124.0001	4 EA	U6, 7, 13, 14	IC, 74ALS245 OCTAL TRISTATE TRANSCEIVER
84.4124.0002	3 EA	U3-5	IC, 74AS244 OCTAL TRISTATE BUFFER
84.4129.0001	2 EA	U15-40	IC, 74F521 8-BIT MAGNITUDE COMPARATOR
84.4132.0001	2 EA	U27, 28	IC, 74HC08 QUAD 2-INPUT AND GATE
84.4133.0001	1 EA	U19	IC, 74HC138 3-TO-8 DECODER
84.4135.0001	1 EA	U26	IC, 74HC148 8-TO-3 PRIORITY ENCODER

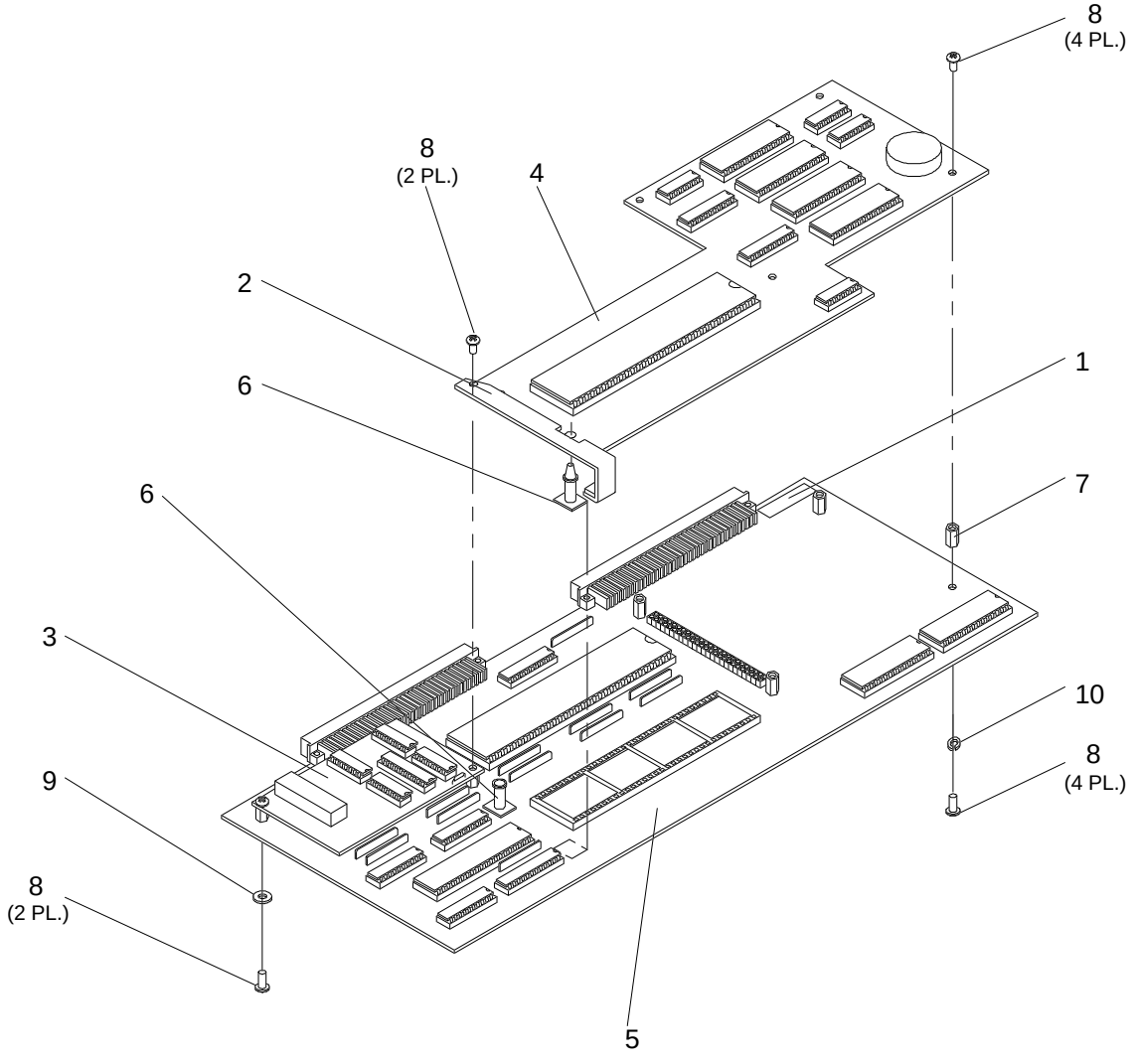
PCB Assembly, LCB (continued)
24.9620.0013 (*VL2B*)

PART NO.	QTY	REF DES	DESCRIPTION
84.4139.0001	1 EA	U42	IC, 74HC191 UP/DOWN COUNTER
84.4140.0001	1 EA	U8	IC, 74HC244 OCTAL TRISTATE BUFFER
84.4147.0001	1 EA	U12	IC, 74S14 HEX INVERTING SCHMIDT TRIGGER
84.4149.0001	1 EA	U2	IC, 74LS240 TRISTATE OCTAL INV BUFFER
84.4136.0001	1 EA	U18	IC, 74HC151 8 CHANNEL MUX
87.7111.0001	1 EA	U1	IC, R68561AP MULTI-PROTOCOL COMM CTRLR
87.7140.0001	1 EA	U44	EPROM, (PGMD:27C256-2) VL2B LL HI
87.7140.0002	1 EA	U43	EPROM, (PGMD:27C256-2) VL2B LL LO
88.8106.0001	1 EA	LED1	LED, RED A
84.0068.0008	1 EA	U34	IC, 68000 MICROPROCESSOR, 16-BIT NMOS 8MHZ
87.7134.0001	1 EA	U24	IC, PAL, 16L8ANC, PROGRAMMED
84.4128.0001	1 EA	U39	IC, 74F163
84.4137.0001	1 EA	U25	IC, 74HC164



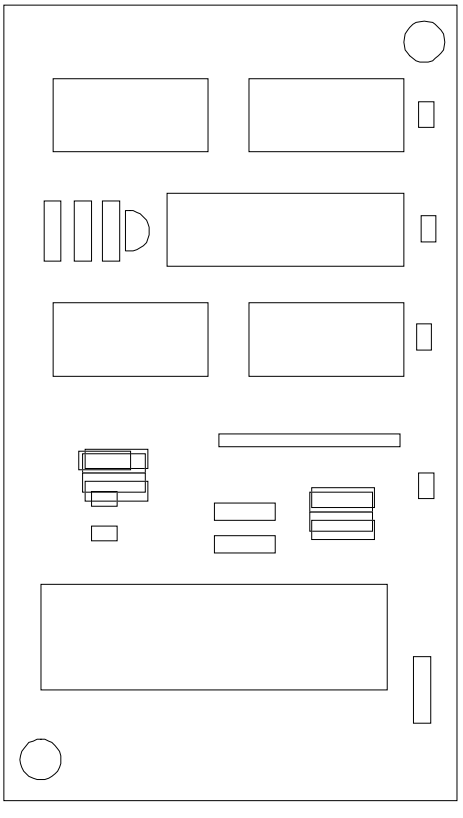
4.2.39 Elec Assembly, LCB Combo w/Upgrade Bd 23.9637.0009 (*VL2C*)

NO.	PART NO.	QTY	DESCRIPTION
1	04.9637.0009	1 EA	LABEL, PART NO 23-9637-0009
2	22.9624.0138	1 EA	ASSY, VL2C LAMP CONTROL BOARD BRACKET
3	24.9620.0017	1 EA	PCB ASSY, VL2 MODEM
4	24.9620.0301	1 EA	PCB ASSY, VL2 LCB UPGRADE W/ALL PARTS
5	24.9637.0049	1 EA	PCB ASSY, VL2 LCB MODIFIED FOR UPGRADE
6	55.2001.0006	2 EA	PCB SUPPORT, 3/8" MINI W/ADH BASE
7	55.2127.0001	6 EA	STANDOFF, 3/16" HEX 4-40 X 3/8"
8	55.2203.0001	12 EA	SCREW, 4-40 X 1/4" PPZ
9	55.2204.0001	2 EA	WASHER, NYLON #4
10	55.6512.0001	4 EA	WASHER, SPLIT LOCK #4



4.2.40 PCB Assembly, Modem 24.9620.0017

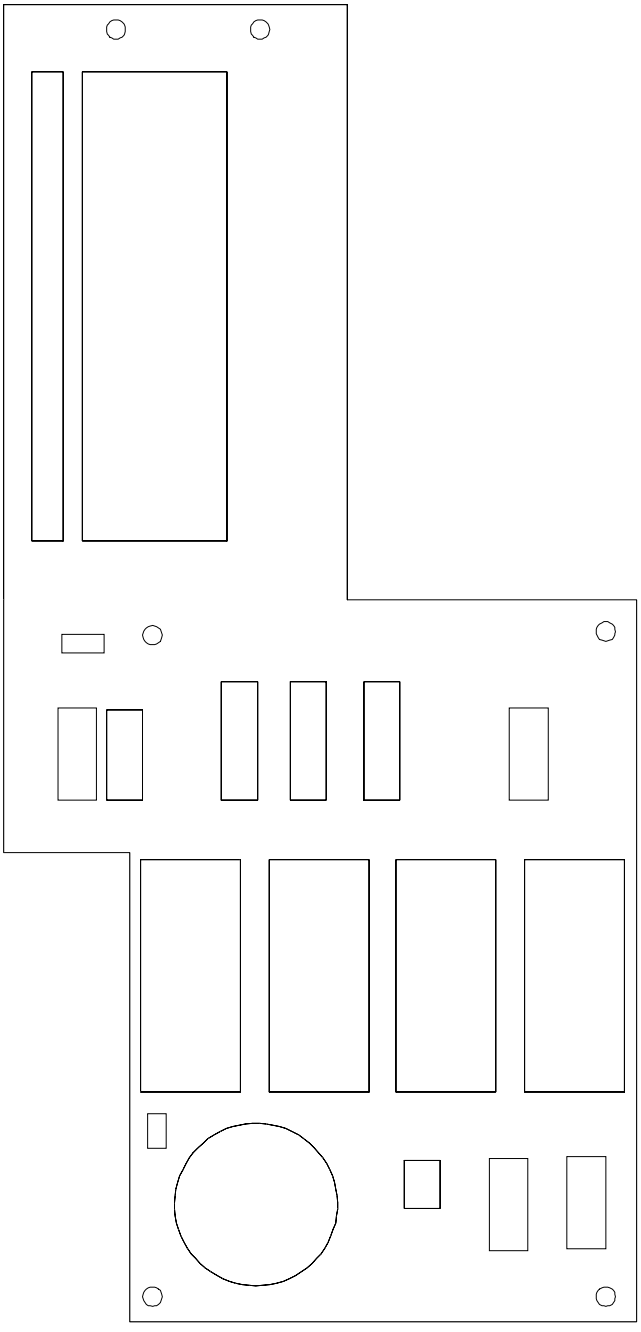
PART NO.	QTY	REF DES	DESCRIPTION
11.9620.0017	1 EA		PCB, MODEM
50.2714.0001	4 EA		SOCKET, 14 PIN DIP
50.2720.0001	1 EA		SOCKET, 20 PIN DIP
52.6203.0001	1 EA		CONN STRIP, 10 PINS
52.6248.0001	1 EA		CONN STRIP, 9 PIN
60.1422.1001	1 EA		RES, 1/4W 5% 1K CF
60.1424.1005	3 EA		RES, 1/4W 5% 10K CF
61.4306.0560	1 EA		RES SIP, 560 6 PIN BUSSED LW PRFLE
62.2013.0104	6 EA		CAP, .1UF, 50V, AXL, CERAMIC, .100", 20%
62.2019.0106	2 EA		CAP, 10UF, 10V, AXL, TANTALM, .290", 10%
66.4503.0001	1 EA		RELAY, 4PDT, 2A, 5VDC, PC MNT, SEALED
80.2513.0005	1 EA		TRANSISTOR, MPSA05 NPN 60V 500mA TO92
82.4306.4001	1 EA		DIODE, RECTIFIER, 1N4001 50V 1A
82.4312.0105	8 EA		DIODE, FAST, MUR105/110 50V 1A
84.4105.0001	1 EA		IC, HD3-6409-9 MANCHESTER ENCODER
84.4132.0001	1 EA		IC, 74HC08 QUAD 2-INPUT AND GATE
84.4134.0001	1 EA		IC, 74HC14 HEX INV SCHMIDT TRIGGER
85.5105.0001	1 EA		IC, 75107B DUAL LINE RECIEVER
85.5106.0001	1 EA		IC, 75112 DUAL LINE DRIVER



4.2.41 PCB Assembly, LCB Upgrade w\All Parts 24.9620.0301 (*VL2C*)

PART NO.	QTY	REF DES	DESCRIPTION
04.9620.0301	1 EA		LABEL, PART NO 24-9620-0301
11.9620.0299	1 EA		PCB, VL2 LCB UPGRADE
50.2708.0001	1 EA	XU1	SOCKET, 8 PIN DIP
50.2714.0001	3 EA	XU2, 3, 11	SOCKET, 14 PIN DIP
50.2716.0001	1 EA	XU8	SOCKET, 16 PIN DIP
50.2720.0001	2 EA	XU9, 10	SOCKET, 20 PIN DIP
50.2732.0001	4 EA	XU4, 5, 6, 7	SOCKET, 32 PIN DIP
50.2764.0001	1 EA	XU12	SOCKET, 64 PIN DIP
52.6203.0001	2 EA	PU(U24)	CONN STRIP, 10 PINS
52.6289.0002	2 EA	P1(U39)	INTERCONNECT STRIP, 8 PIN
52.8284.0001	2 EA	J1, 2	TERM STRIP, 2-PIN STRAIGHT GOLD CONTACT
52.8284.0032	1 EA	P4	TERM STRIP, 32 PINS, 2 ROWS RT ANGL
52.8285.0003	1 EA	J3	TERM STRIP, TSW, 3 PIN, STRAIGHT
52.8294.0032	2 EA	P3(U34)	INTERCONN STRIP, 32 PIN, 1 ROW .210”
60.1420.3902	1 EA	R4	RES, 1/4W 5% 390 OHM CF (VL1)
60.1421.2701	1 EA	R1	RES, 1/4W 5% 2.7M CF
60.1421.4701	1 EA	R3	RES, 1/4W 5% 4,7K CF
60.1422.1001	2 EA	R2, 5	RES, 1/4W 5% 1K CF
62.2013.0104	15 EA	C1, 2, 4-16	CAP, .1UF, 50V, AXL, CERAMIC, .100”, 20%
62.2099.0104	1 EA	C3	CAP, .1UF, 50V, SIP, CERAMIC, .100”, 10%
65.5002.0001	1 EA	B1	BATTERY, LITHIUM 3.6 VOLTS
82.4310.5817	1 EA	D2	DIODE, RECTIFIER, 1N5817 20V 1A
82.5302.4148	1 EA	D1	DIODE, ULTRAFAST, 1N4148 100V 10mA
84.0068.0016	1 EA	U12	IC, MC68HC000P16 MICROPROCESSOR
84.4128.0001	1 EA	U8	IC, 74F163 BINARY COUNTER
84.4131.0001	1 EA	U2	IC, 74HC05 HEX INVERTER W/OPEN COLLECTED
84.4143.0001	1 EA	U2	IC, 74HC14 HEX INV SCHIDT TRIGGER
84.4137.0001	1 EA	U11	IC, 74HC164 8-BIT SHIFT REG SER IN/P OUT
84.5000.0015	2 EA	U5, 7	IC, 581000, 128K X 8, S-RAM, 10 SPEED
85.5114.1210	1 EA	U1	IC, DS1210 NON-VOLATILE CONTROLLER
87.7132.0004	1 EA	U10	GAL, 16V8B-7LP, PROGMD: VL2MU10
87.7132.0005	1 EA	U9	GAL, 16V8B-7LP, PGMD: VL2MU9A

PCB Assembly, LCB Upgrade w/All Parts (continued) 24.9620.0301 (*VL2C*)

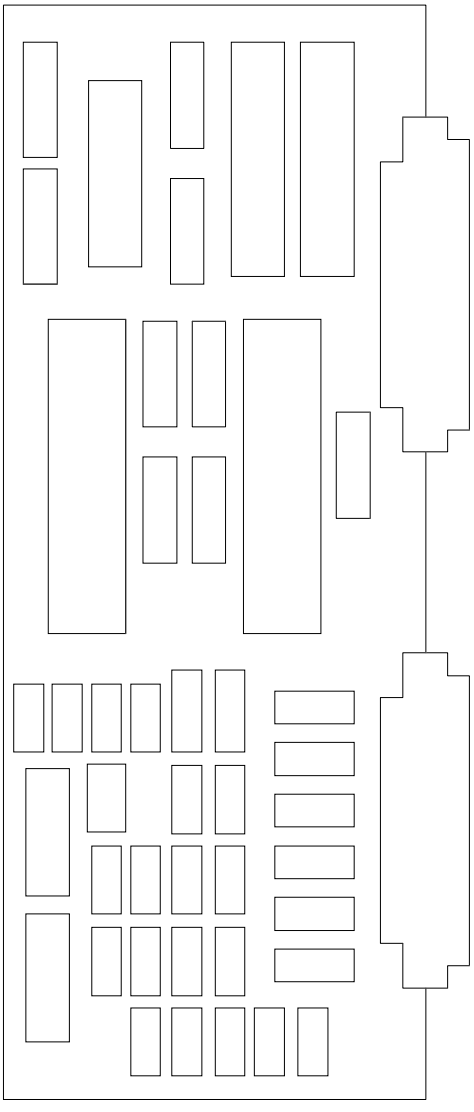


4.2.42 PCB Assembly, LCB Modified For Upgrade 24.9637.0049 (*VL2C*)

PART NO.	QTY	REF DES	DESCRIPTION
04.9637.0049	1 EA		LABEL, PART NO 24-9637-0049
11.9620.0013	1 EA		PCB, LAMP CONTROL
50.2714.0001	12 EA	XU9, 12, 25, 16, 27-29, 31, 32	SOCKET, 14 PIN DIP
50.2716.0001	6 EA	XU17-19, 26, 39, 42	SOCKET, 16 PIN DIP
50.2720.0001	16 EA	XU2-8, 13-15, 20-24 ,40	SOCKET, 20 PIN DIP
50.2724.0002	1 EA	U41	SOCKET, 24 PIN DIP .3” CENTERS
50.2728.0001	2 EA	U43, 44	SOCKET, 28 PIN DIP
50.2740.0001	1 EA	U33	SOCKET, 40 PIN DIP
50.2748.0001	2 EA	U1, 10	SOCKET, 48 PIN DIP
50.2764.0001	2 EA	U11, 34	SOCKET, 64 PIN DIP
52.6205.0001	1 EA	SO2B	CONN SOCKET STRIP, 10 PIN
52.6239.0001	1 EA	SO1	CONN SOCKET STRIP, 50 PIN
52.6246.0001	2 EA	P1, 2	CONN, EURO 64 PIN TYPE C RT ANGL
52.6250.0001	1 EA	SO2A	CONN SOCKET STRIP, 9 PIN
60.1421.4701	2 EA	R7, 10	RES, 1/4W 5% 4.7K CF
60.1422.1001	3 EA	R3, 4, 9	RES, 1/4W 5% 1K CF
60.1424.1005	2 EA	R5, 6	RES, 1/4W 5% 10K CF
60.1425.1003	1 EA	R2	RES, 1/4W 5% 100 OHMS CF
60.1425.2703	1 EA	R8	RES, 1/4W 5% 270 CF
60.1425.5603	1 EA	R1	RES, 1/4W 5% 560 OHM CF
61.4310.0472	18 EA	RP1-18	RES SIP, 472 10 PIN BUSSED LW PRFLE
62.2006.0001	1 EA	C11	CAP, .01UF, 250V, RAD, POLYEST, .300”, 5%
62.2013.0104	34 EA	C1-10, 12-35	CAP, .1UF, 50V, AXL, CERAMIC, .100”, 20%
64.4001.0001	1 EA	U36	OSCILLAOR MODULE, 16MHZ KX0-01
66.4504.0001	1 EA	U30	DELAY LINE, 200ns
80.2513.0005	1 EA	Q1	TRANSISTOR, MPSA05 NPN 60V 500Ma TO92
84.4103.0001	1 EA	U33	IC, AM9513A SYSTEM TIMING & CONTROL
84.4117.0001	2 EA	U22, 23	IC, 74ALS373 TRISTATE OCTAL D-FF
84.4117.0002	1 EA	U16	IC, 74ALS1035 HEX BUFFER W/OPEN COLLECTR
84.4118.0001	1 EA	U11	IC, MC68440P-8 DUAL DIR MEM ACCESS CTRLR
84.4118.0002	1 EA	U32	IC, 74ALS74 DUAL D FLIP FLOP
84.4119.0001	1 EA	U10	IC, 68230P-8 PARALLEL IFC/TIMER
84.4119.0002	1 EA	U37	IC, 74ALS11 TRIPLE 3-IN AND GATE
84.4120.0001	1 EA	U17	IC, 74ALS138 3-TO-8 DECODER
84.4120.0002	1 EA	U31	IC, 74AS1004 HEX DRIVER
84.4121.0001	1 EA	U29	IC, 74AS1032
84.4121.0002	1 EA	U38	IC, 74LS10 TRIPLE 3-IN NAND GATE
84.4122.0001	2 EA	U20, 21	IC, 74ALS244 OCTAL TRI-STATE BUFFER
84.4122.0002	2 EA	U9, 35	IC, 74AS1034 HEX DRIVER
84.4124.0001	4 EA	U6, 7, 13, 14	IC, 74ALS245 OCTAL TRISTATE TRANSCEIVER
84.4124.0002	3 EA	U3-5	IC, 74AS244 OCTAL TRISTATE BUFFER
84.4129.0001	2 EA	U15-40	IC, 74F521 8-BIT MAGNITUDE COMPARATOR
84.4132.0001	2 EA	U27, 28	IC, 74HC08 QUAD 2-INPUT AND GATE
84.4133.0001	1 EA	U19	IC, 74HC138 3-TO-8 DECODER
84.4135.0001	1 EA	U26	IC, 74HC148 8-TO-3 PRIORITY ENCODER

PCB Assembly, LCB Modified For Upgrade (continued) 24.9637.0049 (*VL2C*)

PART NO.	QTY	REF DES	DESCRIPTION
84.4139.0001	1 EA	U42	IC, 74HC191 UP/DOWN COUNTER
84.4140.0001	1 EA	U8	IC, 74HC244 OCTAL TRISTATE BUFFER
84.4147.0001	1 EA	U12	IC, 74S14 HEX INVERTING SCHMIDT TRIGGER
84.4149.0001	1 EA	U2	IC, 74LS240 TRISTATE OCTAL INV BUFFER
84.7409.0151	1 EA	U18	IC, 74F151 8 CHANNEL MUX
87.7111.0001	1 EA	U1	IC, R68561AP MULTI-PROTOCOL COMM CTRLR
87.7174.0001	1 EA	U44	EPROM, (PGMD:27C256-2) VL2C LL HI
87.7174.0002	1 EA	U43	EPROM, (PGMD:27C256-2) VL2C LL LO
88.8106.0001	1 EA	LED1	LED, RED A

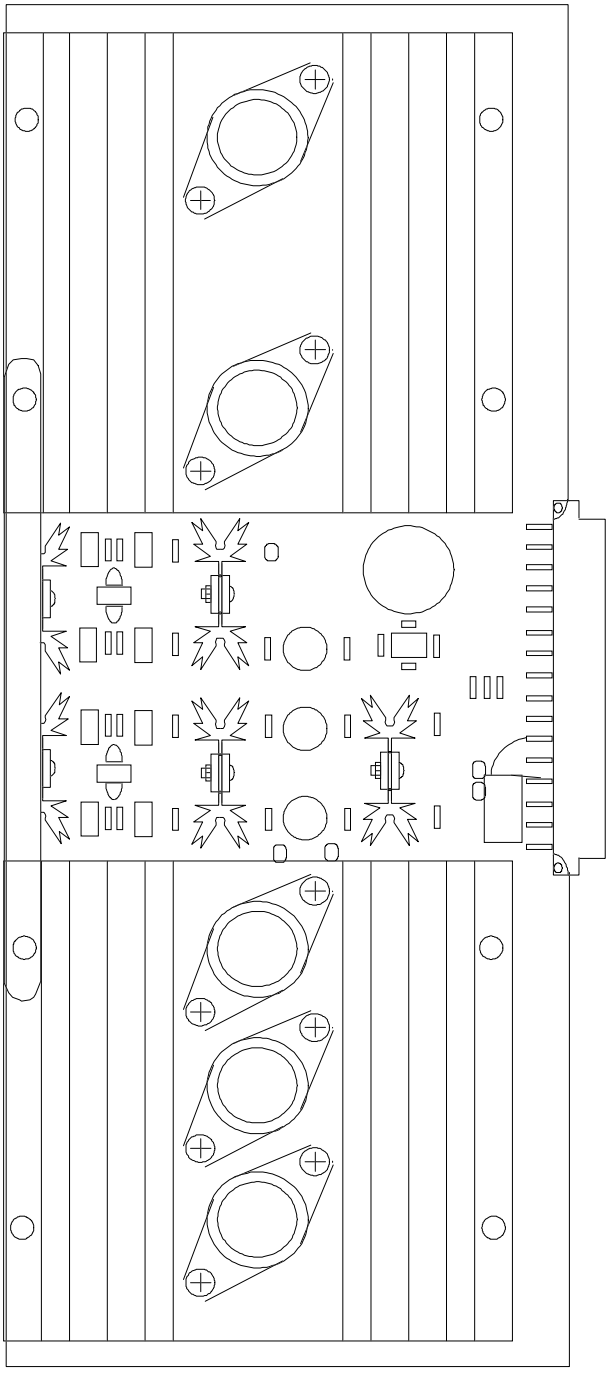


4.2.43 PCB Assembly, Low Voltage Supply 24.9620.0019

PART NO.	QTY	REF DES	DESCRIPTION
04.4013.0502	1 EA		LABEL, .25” X .75”, ADHESIVE
10.9620.0091	2 EA		HEATSINK, LOW VOLTAGE SUPPLY
10.9620.0092	1 EA		STRAP, STIFFENING, LOW VOLTAGE SUPPLY
11.9620.0019	1 EA		PCB, LOW VOLTAGE SUPPLY
50.2708.0001	1 EA		SOCKET, 8 PIN DIP
51.5001.0001	5 EA		HEATSINK, TO0220 1” W/PINS
51.5003.0001	5 EA		SOCKET, TO-3 PC/HEATSINK
51.5005.0001	5 EA		INSULATOR, TO-3
51.5006.0001	6 EA		INSULATOR, TO-220
52.6232.0001	1 EA		CONN, EURO 32 PIN RT ANGL TYPE B
53.2002.0001	8 EA		NUT, 6-32 KEP ZINC PLATED
53.2003.0001	2 EA		NUT, 4-40, KEP ZINC PLATED
53.2016.0001	3 EA		NUT, 4-40 SML PATTERN
53.6520.0001	5 EA		SCREW, 4-40 X 3/8” PPZ
53.6558.0001	6 EA		SCREW, 6-32 X 3/8” PPZ
53.6571.0001	2 EA		SCREW, 6-32 X 1 1/4” PPZ
53.6602.0001	2 EA		SCREW, 4-40 X 1/4” PPZ TYPE F
53.6613.0001	10 EA		SCREW, 6-32 X 1/2” PPZ
55.2218.0001	2 EA		SPACER, 1/4” PND #6 THRU 7/8”
55.6509.0001	6 EA		WASHER, SHOULDER (HEATSINK)
60.1221.1301	2 EA	R14, 15	RES, 1/4W 1% 1.30K CF
60.1223.1787	3 EA	R12, 13, 18	RES, 1/4W 1% 1.78K CF
60.1225.1186	5 EA	R5-8, 28	RES, 1/4W 1% 118 CF
60.1424.1005	6 EA	R19, 20-24	RES, 1/4W 5% 10K CF
60.2423.1007	3 EA	R1, 2, 33	RES, 1/2W 5% 10 OHM
60.2424.4702	4 EA	R4, 11, 17, 27	RES, 1/2W 5% 470 CF
60.2431.1001	2 EA	R9, 25	RES, 1/2W 5% 1.0K CF
60.2432.1504	4 EA	R3, 10, 16, 26	RES, 1/2W 5% 1.5 OHM
60.7441.0033	4 EA	R29-32	RES, 5W 5% .33 WW
62.2014.0104	2 EA	C10, 11	CAP, .1UF, 50V, RAD, CERAMIC, .100”, 20%
62.2017.0105	3 EA	C4, 5, 8	CAP, 1.0UF, 50V, RAD, TANTALM, .125”, 10%
62.2023.0220	3 EA	C3, 7, 12	CAP, 220UF, 35V, RAD, ALUMNUM, .197”, 20%
62.2025.0392	1 EA	C9	CAP, 3900UF, 16V, RAD, ALUMNUM, 1.000”, REF
62.2026.0336	1 EA	C6	CAP, 33UF, 35V, RAD, ALUMNUM, .200”, 20%
62.2027.0475	2 EA	C1, 2	CAP, 4.7UF, 35V, RAD, TANTALM, .125”, 10%
80.1512.6122	2 EA	Q4, 8	TRANSISTOR, 2N6122 NPN 60V 4A TO220
80.1513.6125	2 EA	Q3, 7	TRANSISTOR, 2N6125 PNP 60V 4A TO220
80.1612.5759	1 EA	Q2	TRANSISTOR, 2N5759 NPN 120V 6A TO3
80.1613.6227	3 EA	Q1, 11, 12	TRANSISTOR, MJ15016 PNP 120V 15A TO3
80.2513.0005	2 EA	Q5, 9	TRANSISTOR, MPSA05 NPN 60V 500 mA TO92
80.2513.0055	2 EA	Q6, 10	TRANSISTOR, MPSA55, PNP 60V 500 mA TO92
82.4307.4002	8 EA	D5-12	DIODE, RECTIFIER, 1N4002 100V 1A
82.4309.5401	6 EA	D1-4, 13, 14	DIODE, RECTIFIER, 1N5401 100V 3A
83.3103.0001	3 EA	REG2, 4, 6	IC, LM317T ADJ POS VOLT REGULATOR
83.3104.0001	2 EA	REG3, 5	IC, LM337T ADJ NEG VOLT REGULATOR
83.3107.0001	1 EA	REG1	IC, MPC100 +5V 5A VOLT REGULATOR

PCB Assembly, Low Voltage Supply (continued) 24.9620.0019

PART NO.	QTY	REF DES	DESCRIPTION
83.3111.0001	1 EA	U1	IC, 1458 DUAL BIPOLAR OP AMP
83.3120.0001	1 EA	REG7	IC, 79M05CT VOLT REGULATOR -5V 500 mA



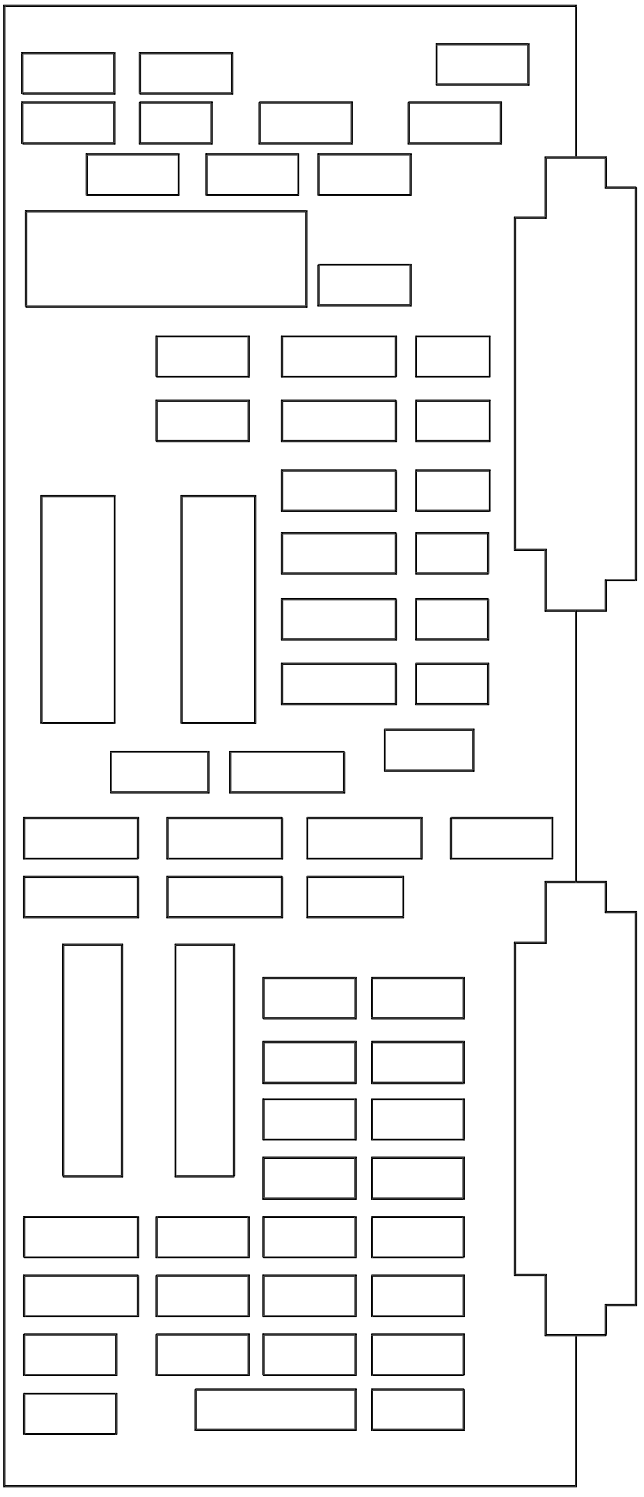
4.2.44 PCB Assembly, CIB (*VL2B*) 24.9620.0021

PART NO.	QTY	REF DES	DESCRIPTION
04.9637.0050	1 EA		LABEL, PART NO. 24-9637-0050
11.9620.0021	1 EA		PCB, CONTROL INTERFACE
50.2708.0001	5 EA	XU1, 18, 38, 39	SOCKET, 8 PIN DIP
50.2714.0001	16 EA	XU8, 9, 16, 19, 20, 28, 33-35	SOCKET, 14 PIN DIP
50.2716.0001	12 EA	XU2-7, 10, 17, 32, 37, 62, 63	SOCKET, 16 PIN DIP
50.2720.0001	22 EA	XU11, 15, 21-27, 30, 31, 44-46	SOCKET, 20 PIN DIP
50.2724.0002	4 EA	XU29, 36, 57, 58	SOCKET, 24 PIN DIP .3” CENTERS
50.2740.0001	2 EA	XU47, 59	SOCKET, 40 PIN DIP
50.2748.0001	3 EA	XU40, 43, 55	SOCKET, 48 PIN DIP
52.6246.0001	2 EA	P1, 2	CONN, EURO 64 PIN TYPE C RT ANGL
60.1222.1504	4 EA	R3, 4, 37, 38	RES, 1/4W 1% 15K CF
60.1222.6818	2 EA	R5, 39	RES, 1/4W 1% 68.1K CF
60.1227.4993	2 EA	R47, 50	RES, 1/4W 1% 4.99K
60.1230.2615	2 EA	R6, 40	RES, 1/4W 1% 261K MF
60.1421.4701	1 EA	R45	RES, 1/4W 5% 4.7K CF
60.1422.1001	8 EA	R26, 28-30, 33, 34, 51, 52	RES, 1/4W 5% 1K CF
60.1424.1005	8 EA	R9, 11, 13, 15, 17, 19, 21, 23	RES, 1/4W 5% 10K CF
60.1425.1003	4 EA	R31, 32, 35, 36	RES, 1/4W 5% 100 OHMS CF
60.1425.2703	1 EA	R46	RES, 1/4W 5% 270 CF
60.1429.3305	2 EA	R48, 49	RES, 1/4W 5% 330K CF
60.1430.5602	4 EA	R18, 20, 22, 24	RES, 1/4W 5% 56K CF
61.4116.0103	2 EA	RP7, 10	RES DIP, 103 16 PIN ISOLATED
61.4306.0472	1 EA	RP8	RES SIP, 472 6 PIN BUSSED LW PRFLE
61.4310.0102	1 EA	RP6	RES SIP, 102 10 PIN BUSSED LW PRFLE
61.4310.0472	14 EA	RP1-5, 9, 11-18	RES SIP, 472 10 PIN BUSSED LW PRFLE
62.2007.0022	2 EA	C10, 14	CAP, .022UF, 250V, RAD, POLYEST, .300”, 5%
62.2010.0001	2 EA	C11, 15	CAP, .1UF, 100V, RAD, POLYEST, .297”, 5%
62.2013.0104	42 EA	C3, 12, 13, 16-26, 29-39, 44	CAP, .1UF, 50V, AXL, CERAMIC, .100”, 20%
62.2051.0001	8 EA	C1, 2, 5, 7, 8, 9, 27, 28	CAP, .01UF, 400V, RAD, POLYEST, .300”, 5%
62.2053.0047	4 EA	R10, 12, 14, 16	CAP, .0047UF, 50V, AXL, CERAMIC, .170”, 10%
62.2058.0474	2 EA	C67, 68	CAP, .47UF, 50V, RAD, CERAMIC, .200”, 20%
63.2016.0002	2 EA	R53, 54	POT, 1K, LIN, 20TRN, VERT MNT, 10%
80.2513.0005	1 EA	Q1	TRANSISTOR, MPSA05 NPN 60V 500mA TO92
82.4306.4001	2 EA	CR7, 8	DIODE, RECTIFIER, 1N4001 50V 1A
82.5311.5357	6 EA	CR1-6	DIODE, ZENER, 1N537A/B 20V 5W
83.3102.0001	5 EA	U1, 18, 38, 39, 64	IC, LF442 DUAL JFET OP AMP
83.3105.0001	1 EA	U20	IC, LM339 COMPARATOR
84.4102.0001	1 EA	U53	IC, AD7226 QUAD 8 BIT D/A CONVERTER
84.4103.0001	2 EA	U47, 59	IC, AM9513A SYSTEM TIMING & CONROL
84.4119.0001	3 EA	U40, 43, 55	IC, 68230P-8 PARALLEL IFC/TIMER
84.4119.0003	1 EA	U34	IC, 74AS04 HEX INVERTER
84.4120.0001	1 EA	U62	IC, 74ALS138 3-TO-8 DECODER
84.4120.0002	1 EA	U33	IC, 74AS1004 HEX DRIVER

PCB Assembly, CIB (*VL2B*) (continued)
24.9620.0021

PART NO.	QTY	REF DES	DESCRIPTION
84.4122.0002	1 EA	U16	IC, 74AS1034 HEX DRIVER
84.4123.0002	1 EA	U63	IC, 74AS175 QUAD D FLIP FLOP
84.4124.0001	2 EA	U14, 15	IC, 74ALS245 OCTAL TRISTATE TRANSCEIVER
84.4124.0002	1 EA	U13	IC, 74AS244 OCTAL TRISTATE BUFFER
84.4125.0001	1 EA	U50	IC, 74AS30 8-IN NAND GATE
84.4126.0001	1 EA	U35	IC, 74AS32 QUAD 2 INPUT OR GATE
84.4128.0001	1 EA	U17	IC, 74F163 BINARY COUNTER
84.4129.0001	2 EA	U11, 12	IC, 74F521 8-BIT MAGNITUDE COMPARATOR
84.4130.0001	2 EA	U42, 48	IC, 74HC04 HEX INVERTER
84.4132.0001	2 EA	U41, 56	IC, 74HC08 QUAD 2-INPUT AND GATE
84.4134.0001	4 EA	U8, 19, 28, 54	IC, 74HC14 HEX INV SCHMIDT TRIGGER
84.4138.0001	1 EA	U10	IC, 74HC175 QUAD D FLIP FLOP
84.4140.0001	1 EA	U44	IC, 74HC244 OCTAL TRISTATE BUFFER
84.4141.0001	2 EA	U27, 30	IC, 74HC273 OCTAL D FLIP FLOP
84.4142.0001	2 EA	U60, 61	IC, 74HC374 TRISTATE OCTAL D FLIP FLOP
84.4145.0001	1 EA	U49	IC, 74HC74 DUAL D FLIP FLOP
84.4146.0001	1 EA	U9	IC, 74HC86 QUAD 2-IN XOR
84.4148.0001	1 EA	U32	IC, 74LS148N 8-TO-3 PRIORITY ENCODER
85.5107.0001	6 EA	U2-7	IC, 75436 QUAD PERIPHERAL DRIVER
87.7108.0001	1 EA	U29	PAL, 20L10CNS PROGRAMMED: ISEB 1.0
87.7110.0002	2 EA	U57, 58	PAL, 20X10NC PROGRAMMED: ISEB 1.0
87.7134.0002	6 EA	U21-26	IC, 16V8D15QP, PGMD: VL2IU21 5C69
87.7134.0003	1 EA	U31	IC, 16V8D15QP, PGMD: VL2IU31 2067
87.7134.0004	2 EA	U45, 46	IC, 16V8D15QP, PGMD: VL2IU45 72BA
87.7135.0002	1 EA	U36	IC, GAL 20V8-25QP PGMD: VL2IU36 7E65
88.8106.0001	1 EA	LED1	LED, RED AS

PCB Assembly, CIB (*VL2B*)(continued)
24.9620.0021



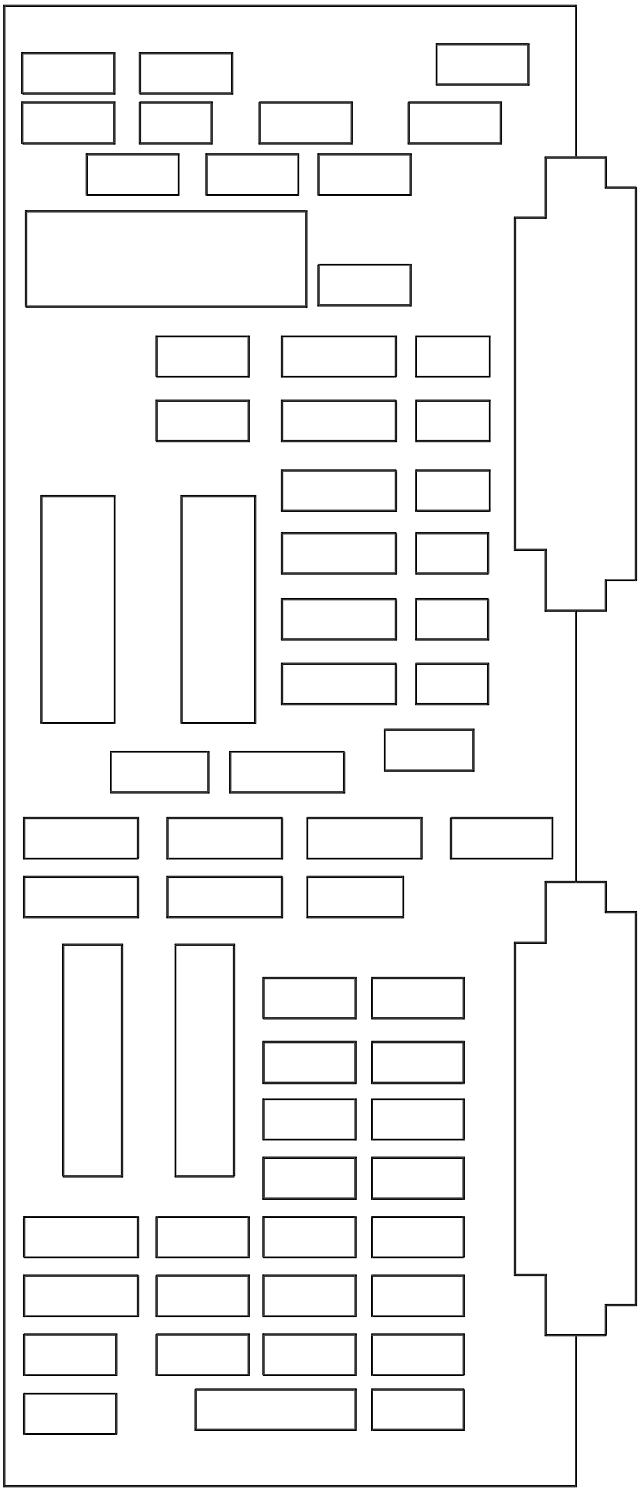
4.2.45 PCB Assembly, CIB Modified For Upgrade 24.9637.0050 (*VL2C*)

PART NO.	QTY	REF DES	DESCRIPTION
04.9637.0050	1 EA		LABEL, PART NO. 24-9637-0050
11.9620.0021	1 EA		PCB, CONTROL INTERFACE
50.2708.0001	5 EA	XU1, 18, 38, 39	SOCKET, 8 PIN DIP
50.2714.0001	16 EA	XU8, 9, 16, 19, 20, 28, 33-35	SOCKET, 14 PIN DIP
50.2716.0001	12 EA	XU2-7, 10, 17, 32, 37, 62, 63	SOCKET, 16 PIN DIP
50.2720.0001	22 EA	XU11, 15, 21-27, 30, 31, 44-46	SOCKET, 20 PIN DIP
50.2724.0002	4 EA	XU29, 36, 57, 58	SOCKET, 24 PIN DIP .3” CENTERS
50.2740.0001	2 EA	XU47, 59	SOCKET, 40 PIN DIP
50.2748.0001	3 EA	XU40, 43, 55	SOCKET, 48 PIN DIP
52.6246.0001	2 EA	P1, 2	CONN, EURO 64 PIN TYPE C RT ANGL
60.1222.1504	4 EA	R3, 4, 37, 38	RES, 1/4W 1% 15K CF
60.1222.6818	2 EA	R5, 39	RES, 1/4W 1% 68.1K CF
60.1227.4993	2 EA	R47, 50	RES, 1/4W 1% 4.99K
60.1230.2615	2 EA	R6, 40	RES, 1/4W 1% 261K MF
60.1421.4701	1 EA	R45	RES, 1/4W 5% 4.7K CF
60.1422.1001	8 EA	R26, 28-30, 33, 34, 51, 52	RES, 1/4W 5% 1K CF
60.1424.1005	8 EA	R9, 11, 13, 15, 17, 19, 21, 23	RES, 1/4W 5% 10K CF
60.1425.1003	4 EA	R31, 32, 35, 36	RES, 1/4W 5% 100 OHMS CF
60.1425.2703	1 EA	R46	RES, 1/4W 5% 270 CF
60.1429.3305	2 EA	R48, 49	RES, 1/4W 5% 330K CF
60.1430.5602	4 EA	R18, 20, 22, 24	RES, 1/4W 5% 56K CF
61.4116.0103	2 EA	RP7, 10	RES DIP, 103 16 PIN ISOLATED
61.4306.0472	1 EA	RP8	RES SIP, 472 6 PIN BUSSED LW PRFLE
61.4310.0102	1 EA	RP6	RES SIP, 102 10 PIN BUSSED LW PRFLE
61.4310.0472	14 EA	RP1-5, 9, 11-18	RES SIP, 472 10 PIN BUSSED LW PRFLE
62.2007.0022	2 EA	C10, 14	CAP, .022UF, 250V, RAD, POLYEST, .300”, 5%
62.2010.0001	2 EA	C11, 15	CAP, .1UF, 100V, RAD, POLYEST, .297”, 5%
62.2013.0104	42 EA	C3, 12, 13, 16-26, 29-39, 44	CAP, .1UF, 50V, AXL, CERAMIC, .100”, 20%
62.2051.0001	8 EA	C1, 2, 5, 7, 8, 9, 27, 28	CAP, .01UF, 400V, RAD, POLYEST, .300”, 5%
62.2053.0047	4 EA	R10, 12, 14, 16	CAP, .0047UF, 50V, AXL, CERAMIC, .170”, 10%
62.2058.0474	2 EA	C67, 68	CAP, .47UF, 50V, RAD, CERAMIC, .200”, 20%
63.2016.0002	2 EA	R53, 54	POT, 1K, LIN, 20TRN, VERT MNT, 10%
80.2513.0005	1 EA	Q1	TRANSISTOR, MPSA05 NPN 60V 500mA TO92
82.4306.4001	2 EA	CR7, 8	DIODE, RECTIFIER, 1N4001 50V 1A
82.5311.5357	6 EA	CR1-6	DIODE, ZENER, 1N537A/B 20V 5W
83.3102.0001	5 EA	U1, 18, 38, 39, 64	IC, LF442 DUAL JFET OP AMP
83.3105.0001	1 EA	U20	IC, LM339 COMPARATOR
84.4102.0001	1 EA	U53	IC, AD7226 QUAD 8 BIT D/A CONVERTER
84.4103.0001	2 EA	U47, 59	IC, AM9513A SYSTEM TIMING & CONROL
84.4119.0001	3 EA	U40, 43, 55	IC, 68230P-8 PARALLEL IFC/TIMER
84.4119.0003	1 EA	U34	IC, 74AS04 HEX INVERTER
84.4120.0001	1 EA	U62	IC, 74ALS138 3-TO-8 DECODER
84.4120.0002	1 EA	U33	IC, 74AS1004 HEX DRIVER

PCB Assembly, CIB Modified For Upgrade (continued) 24.9637.0050 (*VL2C*

PART NO.	QTY	REF DES	DESCRIPTION
84.4122.0002	1 EA	U16	IC, 74AS1034 HEX DRIVER
84.4123.0002	1 EA	U63	IC, 74AS175 QUAD D FLIP FLOP
84.4124.0001	2 EA	U14, 15	IC, 74ALS245 OCTAL TRISTATE TRANSCEIVER
84.4124.0002	1 EA	U13	IC, 74AS244 OCTAL TRISTATE BUFFER
84.4125.0001	1 EA	U50	IC, 74AS30 8-IN NAND GATE
84.4126.0001	1 EA	U35	IC, 74AS32 QUAD 2 INPUT OR GATE
84.4128.0001	1 EA	U17	IC, 74F163 BINARY COUNTER
84.4129.0001	2 EA	U11, 12	IC, 74F521 8-BIT MAGNITUDE COMPARATOR
84.4130.0001	2 EA	U42, 48	IC, 74HC04 HEX INVERTER
84.4132.0001	2 EA	U41, 56	IC, 74HC08 QUAD 2-INPUT AND GATE
84.4134.0001	4 EA	U8, 19, 28, 54	IC, 74HC14 HEX INV SCHMIDT TRIGGER
84.4138.0001	1 EA	U10	IC, 74HC175 QUAD D FLIP FLOP
84.4140.0001	1 EA	U44	IC, 74HC244 OCTAL TRISTATE BUFFER
84.4141.0001	2 EA	U27, 30	IC, 74HC273 OCTAL D FLIP FLOP
84.4142.0001	2 EA	U60, 61	IC, 74HC374 TRISTATE OCTAL D FLIP FLOP
84.4145.0001	1 EA	U49	IC, 74HC74 DUAL D FLIP FLOP
84.4146.0001	1 EA	U9	IC, 74HC86 QUAD 2-IN XOR
84.4148.0001	1 EA	U32	IC, 74LS148N 8-TO-3 PRIORITY ENCODER
85.5107.0001	6 EA	U2-7	IC, 75436 QUAD PERIPHERAL DRIVER
87.7108.0001	1 EA	U29	PAL, 20L10CNS PROGRAMMED: ISEB 1.0
87.7110.0002	2 EA	U57, 58	PAL, 20X10NC PROGRAMMED: ISEB 1.0
87.7134.0002	6 EA	U21-26	IC, 16V8D15QP, PGMD: VL2IU21 5C69
87.7134.0003	1 EA	U31	IC, 16V8D15QP, PGMD: VL2IU31 2067
87.7134.0004	2 EA	U45, 46	IC, 16V8D15QP, PGMD: VL2IU45 72BA
87.7135.0006	1 EA	U36	IC, GAL 20V8-25QP PGMD: VL2IU36A 2D91
88.8106.0001	1 EA	LED1	LED, RED AS

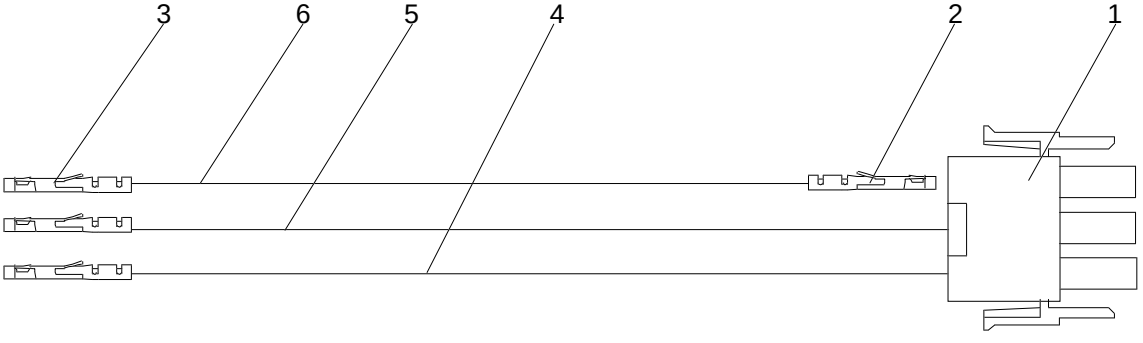
PCB Assembly, CIB Modified For Upgrade (continued) 24.9637.0050 (*VL2C*



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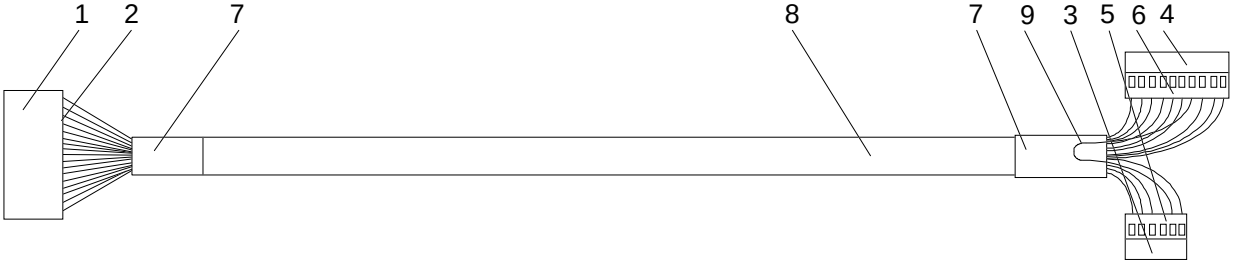
4.2.46 Cable Assembly. AC Power Input 25.1005.0003

NO.	PART NO.	QTY	DESCRIPTION
1	52.6231.0001	1 EA	PLUG HOUSING, MNLOK PLUG 3 POS
2	52.8276.0001	3 EA	CONTACT PIN, TIN 18-16 AWG TYPE 3+ (LOOSE)
3	52.8256.0001	3 EA	CONTACT SCKT, 20 AWG TIN MNLOK (LOOSE)
4	73.7006.0001	12 IN	WIRE, 16 AWG 300V 80C BLK STRND UL1061
5	73.7007.0001	12 IN	WIRE, 16 AWG 300V 80C WHT STRND UL1061
6	73.7008.0001	12 IN	WIRE, 16 AWG 300V 80C GRN STRND UL1061



4.2.47 Cable Assembly, APS-Mother Board 25.1005.0018

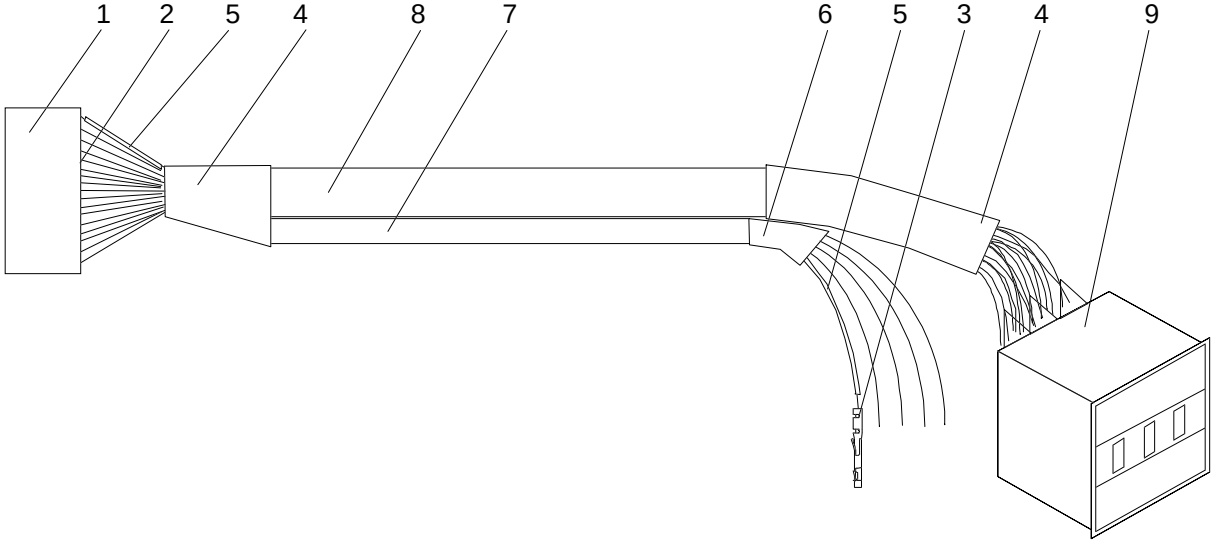
NO.	PART NO.	QTY	DESCRIPTION
	52.6211.0001	1 EA	COVER, BACK MT RECEPT 18 POS (NOT SHOWN)
1	52.6213.0001	1 EA	COVER, LATCH MT RECEPT 18 POS
2	52.6213.0001	1 EA	CONN HOUSING, MT RECEPT 18 POS
3	52.6244.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 6 PIN
4	52.6361.0001	1 EA	CONN HOUSING, MTA CLOSED END RED 10 POS
5	52.6424.0006	1 EA	COVER, STRAIN RELIEF/6 POS MTA 100
6	52.6424.0010	1 EA	COVER, STRAIN RELIEG/10 POS MTA 100
7	55.2197.0001	6 IN	HEAT SHRINK 3/8” BLACK
8	73.7049.0002	36 IN	CABLE, 22 AWG, 15 COND STRANDED
9	73.7062.0001	7 IN	WIRE, 22 AWG STRND VIOLET



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4.2.48 Cable Assembly, Thumbwheel Switch 25.7020.0001

NO.	PART NO.	QTY	DESCRIPTION
	52.6215.0001	1 EA	COVER, BACK MT RECEPT 20 POS (NOT SHOWN)
1	52.6216.0001	1 EA	COVER, LATCH MT RECEPT 20 POS
2	52.6217.0001	1 EA	CONN HOUSING, MT RECEPT 20 POS
3	52.8277.0001	5 EA	CONTACT PIN, 22 AWG GLD TYPE 3+ (LOOSE)
4	55.2183.0001	4 IN	HEAT SHRINK, BLACK 1/2”
5	55.2199.0002	4 IN	HEATSHRINK, 1/16” CLEAR
6	55.2200.0001	2 IN	HEAT SHRINK, 3/16” BLACK
7	73.7039.0001	16 IN	CBL, 22 AWG STRND 4 COND POLYPR INSUL
8	73.7049.0001	24 IN	CBL, 24 AEG 15 COND PVC
9	74.1013.0001	1 EA	SWITCH, THBWHL SEALED 3 SEC 0-9 LMP ADDRS

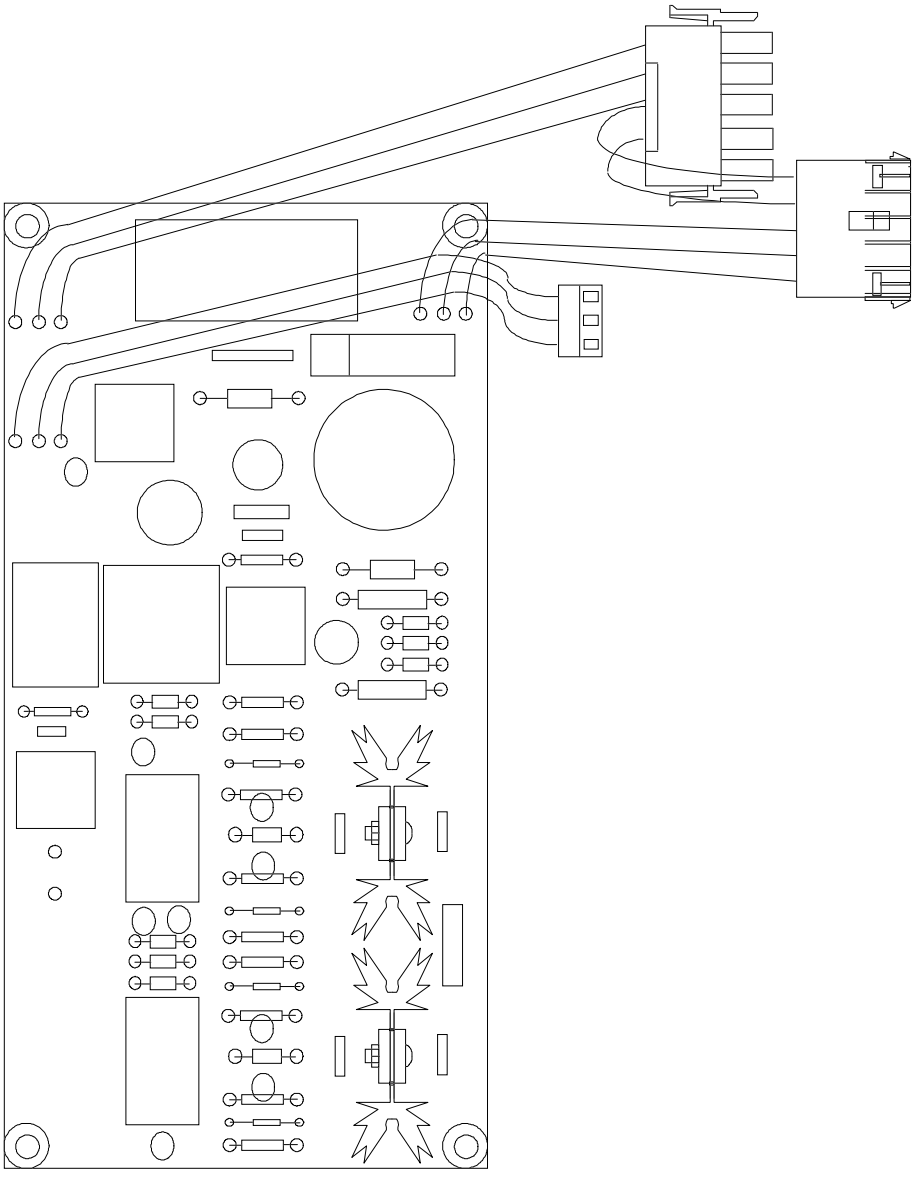


4.2.49 PCB Assembly, Fan Drive Plus 24.9623.161 (*VL2C* ONLY)

PART NO.	QTY	REF DES	DESCRIPTION
11.9623.0162	1 EA		PCB, FAN DRIVE PLUS, VL2C
25.9623.0163	1 EA	CA1	CABLE ASSY, FANDRIVE PLUS, 18”
25.9623.0197	1 EA	CA2	CABLE ASSY, FAN DRIVE DC POWER
50.2708.0001	3 EA	XU5, 6, 7	SOCKET, 8 PIN DIP
50.2714.0001	2 EA	XU1, 2	SOCKET, 14 PIN DIP
51.5001.0001	2 EA	HS1, 2	HEATSINK, 10-220 1” W/PINS
51.5006.0001	4 EA	AP: Q1-4	INSULATOR, TO-220
51.5011.0002	1 EA	AP: LED1	MOUNTING PAD, LED
52.5000.0028	1 EA	XU3	SOCKET, 28 PIN PLCC
52.8283.0001	2 EA	TP1, 2	TERM, SWAGE MT TURRET
53.2016.0001	2 EA	AP: Q1-4	NUT, 4-40 SML PATTERN
53.6520.0001	2 EA	AP: Q1-4	SCREW, 4-40 X 3/8” PPZ
55.2186.0001	1 EA	AP: F1	SCABLE TIE, SMALL .10 X 4”
55.2236.0001	3 EA	AP: U5, 6, 7	CAP, PLASTIC, .375SQ X .325H X .040T
55.2236.0002	2 EA	AP: U1, 2	CAP, PLASTIC, .375W X .700L X .325H X .040T
55.2236.0003	1 EA	AP: U3	CAP, PLASTIC, .660SQ X .375H X .040T
55.6509.0001	4 EA	AP: Q1-4	WASHER, SHOULDER (HEATSINK)
55.6708.0125	4 EA	AP: PCB	STANDOFF, 1/4” RND 4-40 X 1/8” SWAGE TYPE
60.1422.3301	1 EA	R12	RES, 1/4W 5% 3.3K CF
60.1424.1005	1 EA	R16	RES, 1/4W 5% 10K CF
60.1425.1003	1 EA	R18	RES, 1/4W 5% 100 OHMS CF
60.1426.1003	6 EA	R2, 3, 5, 6, 8, 9	RES, 1/4W 5% 100K CF
60.1429.3303	5 EA	R1, 4, 7, 10, 11	RES, 1/4W 5% 330 CF
60.3420.1000	1 EA	R17	RES, 1W 5% 1 OHM CF
60.3420.4702	1 EA	R19	RES, 1W 5% 47K CF
62.2015.0104	1 EA	C10	CAP, .1UF, 50V, SIP, CERAMIC, .100”, 20%
62.2023.0220	1 EA	C16	CAP, 220UF, 35V, RAD, ALUMNUM, .197”, 20%
62.2027.0475	9 EA	C1-8, 24	CAP, 4.7UF, 35V, RAD, TANTALM, .125”, 10%
62.2029.0505	1 EA	C22	CAP, 5UF, 200V, AXL, POLYEST, .062”, 10%
62.2046.0001	1 EA	C23	CAP, .001UF, 1000V, RAD, POLYEST, .400”, 5%
62.2060.0151	1 EA	C19	CAP, 150PF, 50V, RAD, DIPMICA, 5%
62.2081.0227	1 EA	C21	CAP, 220UF, 200V, RAD, ALUM
62.2094.0103	5 EA	C11-14, 18	CAP, .01UF, 100V, RAD, POLYEST, .200”, 5%
63.2025.0001	1 EA	VR1	THERMISTOR, CARBON 1.7A, 25.0 OHM
64.4004.0001	1 EA	OSC1	OSCILLATOR, 20.000 MHZ
70.3730.0001	1 EA	F1	FUSE, LAMP, TR5-T UL/CSA
70.3732.0001	1 EA	FH1 (AP: F1)	FUSEHOLDER, TR5, 19560
80.1610.0730	4 EA	Q1-4	TRANSISTOR, IRF730 NCH 400V, 3A
82.4304.4040	1 EA	BR1	BRIDGE RECTIFIER, CBR4M-LO40, 400V, 4A
82.4317.5819	5 EA	D4, 8, 9, 12, 13	DIODE, RECTIFIER, 1N589 40V 1A
82.5302.4148	4 EA	D1, 3, 5, 7	DIODE, ULTRAFAST, 1N4148 100V 10mA
82.5317.5404	1 EA	D11	DIODE, 1N5404, 300V, 3A
82.5318.0160	2 EA	D2, 6	DIODE, MUR160, 600V, 1A
82.5398.8520	1 EA	Z3	DIODE, ZENER 1.5KE/220A
83.3116.0001	1 EA	U6	IC, 3425 OVER/UNDER SENSING CKT

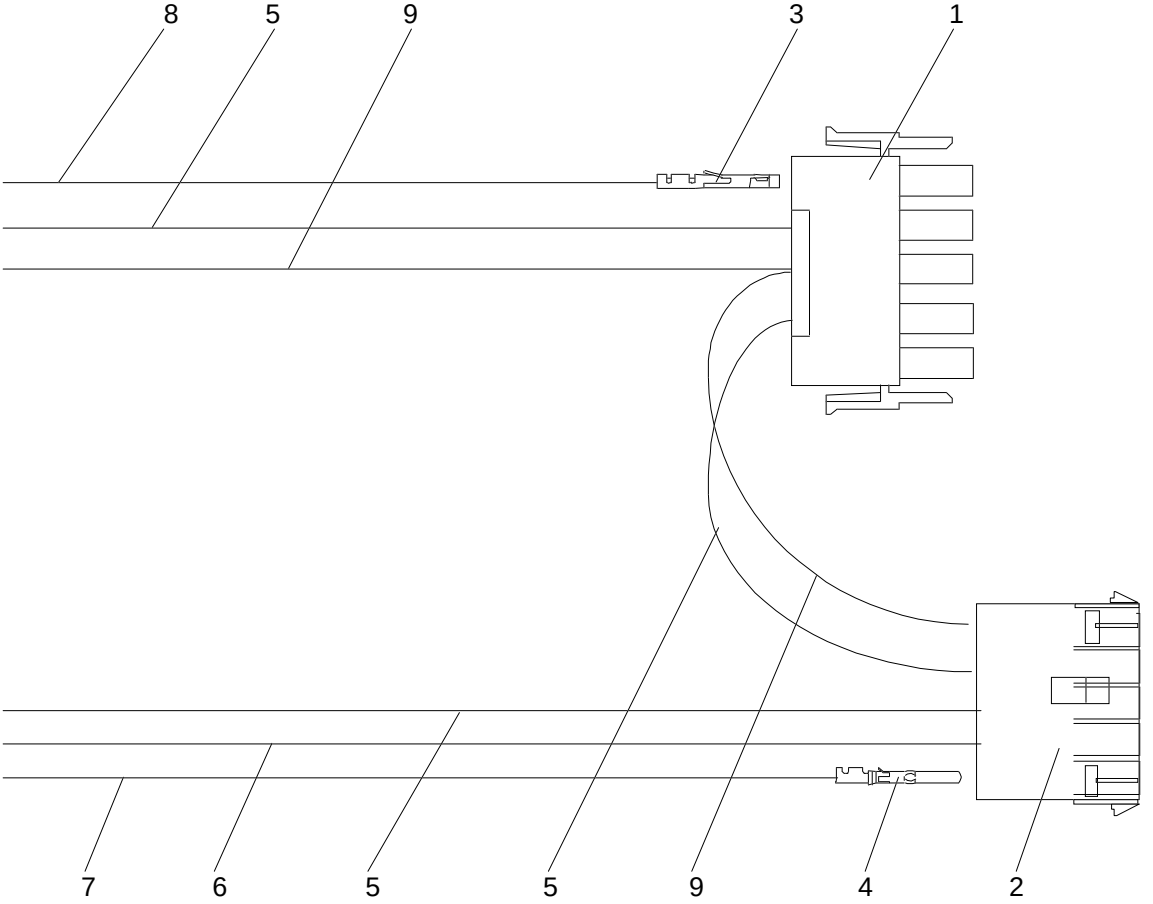
PCB Assembly, Fan Drive Plus (continued) 24.9623.161 (*VL2C* ONLY)

PART NO.	QTY	REF DES	DESCRIPTION
84.4234.0001	1 EA	U5	IC, LTC485CN8 RS422/RS485 TRANSCEIVER DIP PKG
85.5144.1232	1 EA	AP: U7	IC, DS1232 MICRO MONITOR
85.5120.0001	2 EA	U1, 2	IC, IR2110, 1/2 BRIDGE DRIVER
87.7115.0752	1 EA	U3	EPROM, S87C752-4A28, MICRO-CONTROLLER
88.8101.0001	1 EA	LED1	LED, RED HP



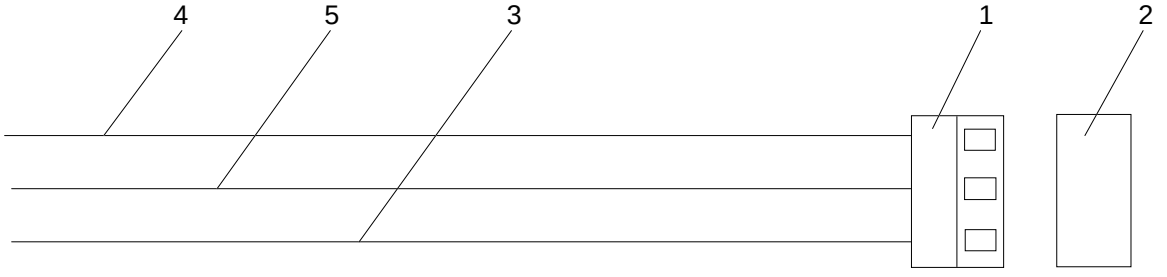
4.2.50 Cable Assembly, Fandrive Plus, 18" 25.9623.163 (*VL2C* ONLY)

NO.	PART NO.	QTY	DESCRIPTION
1	52.6230.0005	1 EA	CONN, 5 CIR CAP (RCPT) MATE-N-LOK 350810-1
2	52.6237.0001	1 EA	CONN PLUG, MNLOK 5 POS
3	52.8256.0001	4 EA	CONTACT SCKT, 20 AWG TIN MNLOK (LOOSE)
4	52.8258.0001	5 EA	CONTACT PIN, 20-14 AWG MNLOK (LOOSE)
5	73.7031.0001	41 IN	WIRE, 22 AWG STRND BLACK
6	73.7032.0001	19 IN	WIRE, 22 AWG STRND BROWN
7	73.7033.0001	19 IN	WIRE, 22 AWG STRND BLUE
8	73.7046.0001	14 IN	WIRE, 22 AWG STRND GREEN
9	73.7052.0001	22 IN	WIRE, 22 AWG STRND WHITE



4.2.51 Cable Assembly, Fan Drive DC Power 25.9623.197 (*VL2C* ONLY)

NO.	PART NO.	QTY	DESCRIPTION
1	52.6396.2404	1 EA	RECEPT, MTA100 W/TAB NAT 4 POS
2	52.6424.0004	1 EA	COVER, STRAIN RELIEF/4 POS MTA
3	73.7056.0001	7 IN	WIRE, 24 AWG STRND RED
4	73.7056.0004	7 IN	WIRE, 24 AWG STRND YELLOW
5	73.7056.0008	7 IN	WIRE, 24 AWG STRND GREY



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Chapter 5. Wiring Diagrams

This chapter contains the following sections:

5.1 Connector Type Identification

5.2 Connector Pin Diagrams

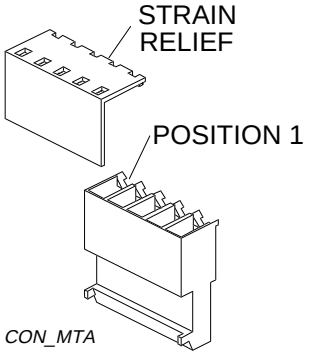
5.3 Schematic Diagrams

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5.1 Connector Type Identification

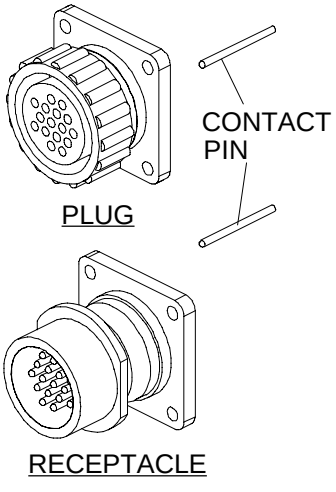
The **VL2B** and **VL2C** luminaire contains the following connector types:

5.1.1 MTA-100 and MTA-156



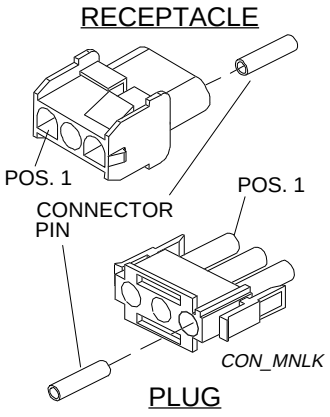
MTA-100 and MTA-156 connectors are used to connect wires to PC boards. MTA-100 connectors are smaller in size and use smaller diameter wire than MTA-156 connectors. The connectors range from two through ten positions and come in red, yellow and black colors. A strain relief is usually used in conjunction with the connector to protect the wire connection. This illustration shows a typical five position MTA style connector and strain relief.

5.1.2 CPC



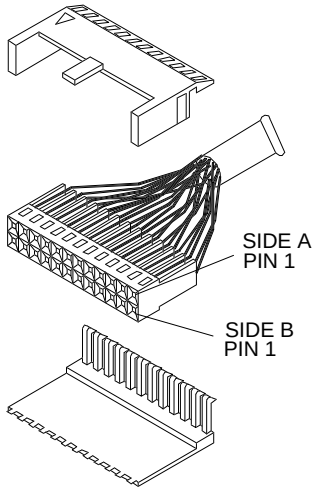
CPC connectors are used to connect luminaire wiring to external cables. The **VL2** luminaire input panel uses one nine position CPC connector (receptacle type). Contact pins are installed on the wires and the wires and contact pins are inserted into the CPC connector. Refer to the Connector Pin Locations section in this chapter for position identification.

5.1.3 Mate-N-Lok



Mate-N-Lok connectors are used to connect internal wire harnesses. Connector pins are installed on the wires and the wires and connector pins are inserted into Mate-N-Lok plugs or receptacles. Plugs and receptacles may be free (as shown) or PC board mounted. Although a three position connector is shown, the **VL2** luminaires use three, four, five, six, and nine position connectors.

5.1.4 MT



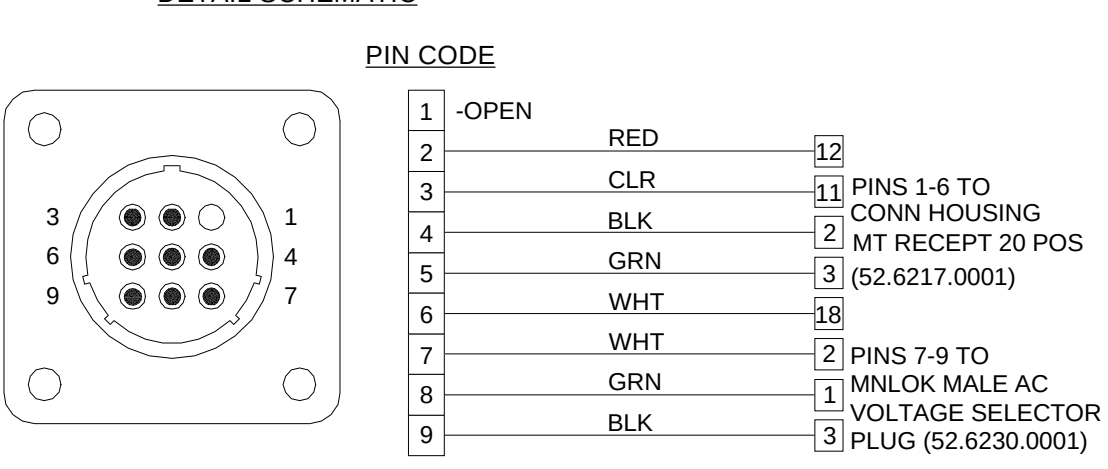
MT connectors are used to connect wire cables to PC boards. The black MT connector has 10, 18, 24 and 26 positions divided into an A and B side. Wires are installed from each side and protected with two covers. The illustration shows the pin 1 for sides A and B and covers.

5.2 Connector Pin Diagrams

5.2.1 9-Position Chassis Mount Lamp Receptacle (52.6251.0001)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C	-	-
2	RED	22 AWG	DATA BDST+
3	CLR	22 AWG	SHIELD
4	BLK	22 AWG	DATA BDST
5	GRN	22 AWG	DATA RPLY
6	WHT	22 AWG	DATA RPLY+
7	WHT	18 AWG	AC LO
8	GRN	18 AWG	GROUND
9	BLK	18 AWG	AC HI

DETAIL SCHEMATIC



5.2.2 Pan Mechanism- Mother Board Cable (25.1005.0010)

Note: Side A contains the manufacturer's part number. Side B is blank

10-POS MT RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	SIDE A DESCRIPTION
1	BLK	22 AWG	PAN MOTOR VOLTS
2	BLU	22 AWG	PAN TACH VOLTS-
3	YEL	22 AWG	PAN ENC PHSE B
4	N/C		
5	N/C		
PIN	**WIRE COLOR**	**WIRE SIZE**	**SIDE B DESCRIPTION**
6	ORG	22 AWG	+5 V
7	WHT	22 AWG	PAN TACH VOLTS
8	BRN	22 AWG	PAN EC PHSE A
9	RED	22 AWG	PAN MOTOR GND
10	GRN	22 AWG	PAN ENCODER GND

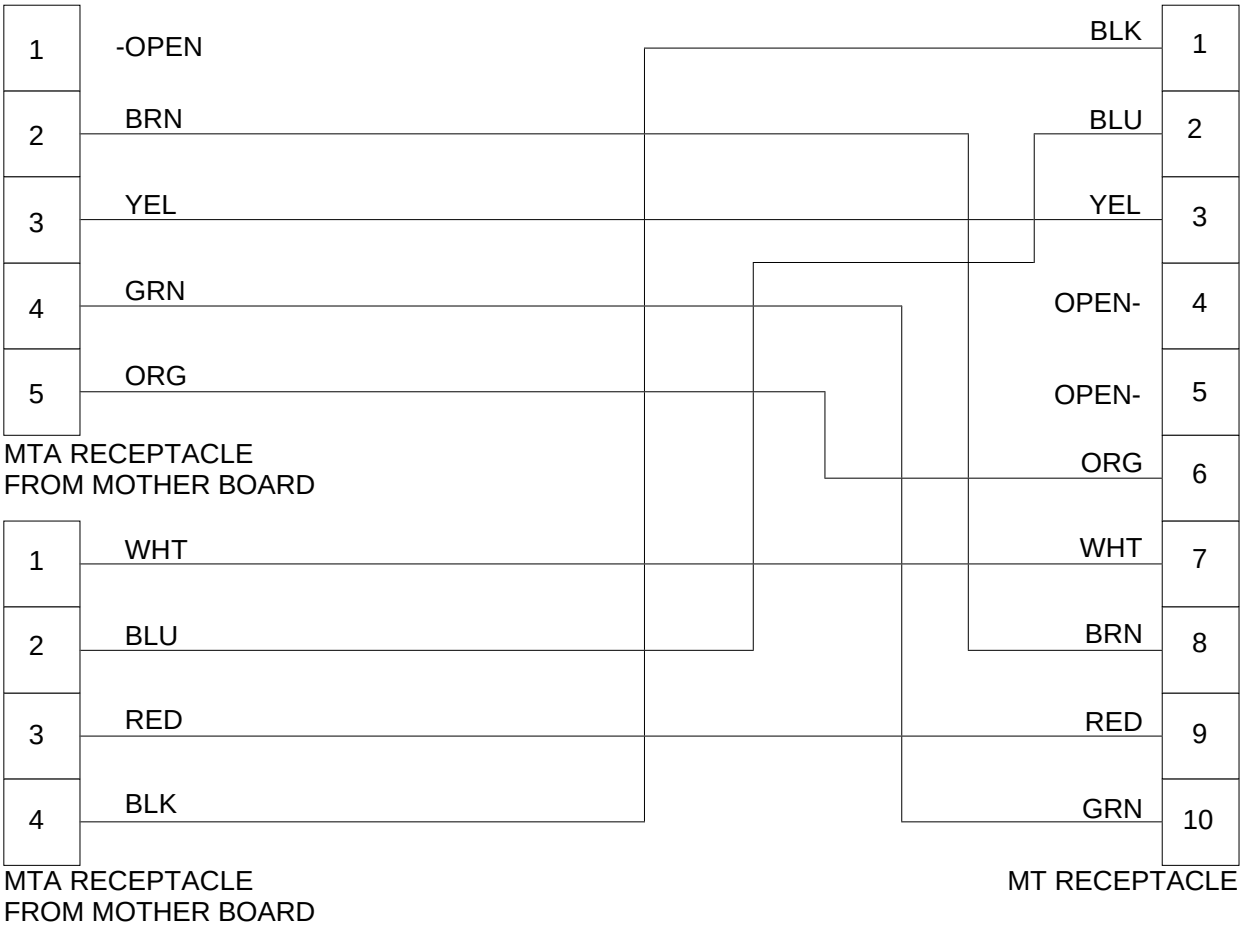
5-POS MTA RECEPTACLE FROM MOTHER BOARD

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C		
2	BRN	22 AWG	3B
3	YEL	22 AWG	3A
4	GRN	22 AWG	5B
5	ORG	22 AWG	1B

4-POS MTA RECEPTACLE FROM MOTHER BOARD

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	22 AWG	2B
2	BLU	22 AWG	2A
3	RED	22 AWG	4B
4	BLK	22 AWG	1A

Pan Mechanism- Mother Board Cable (continued) (25.1005.0010)



5.2.3 APS Mother Board Cable (25.1005.0018)

Note: Side A contains the manufacturer's part number. Side B is blank

18-POS MT RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	SIDE A DESCRIPTION
1	GRN	22 AWG	GND
2	BLK	22 AWG	-15
3	WHT	22 AWG	15
4	N/C	22 AWG	+20
5	N/C	22 AWG	+20
6	BLU	22 AWG	POWER ON/FAIL
7	WHT/BLK	22 AWG	LAMP ON
8	RED/BLK	22 AWG	STANDBY
9	ORG	22 AWG	SHORT
PIN	**WIRE COLOR**	**WIRE SIZE**	**SIDE B DESCRIPTION**
10	GRN/BLK	22 AWG	GND
11	RED	22 AWG	+5
12	N/C	22 AWG	+15
13	BLU/WHT	22 AWG	PWR SPLY OVR TEMP
14	N/C	22 AWG	INTENSITY
15	RED/WHT	22 AWG	FAN
16	BLK/WHT	22 AWG	LAMP ON
17	BLU/BLK	22 AWG	START
18	ORG/BLK	22 AWG	I PRES

RED 6-POS MTA 100 RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED/WHT	22 AWG	H.S. FAN
2	BLU	22 AWG	POWER ON
3	RED	22 AWG	+5 V
4	BLK/WHT	22 AWG	LAMP ON
5	VIO	22 AWG	110 MODE*
6	GRN	22 AWG	GND

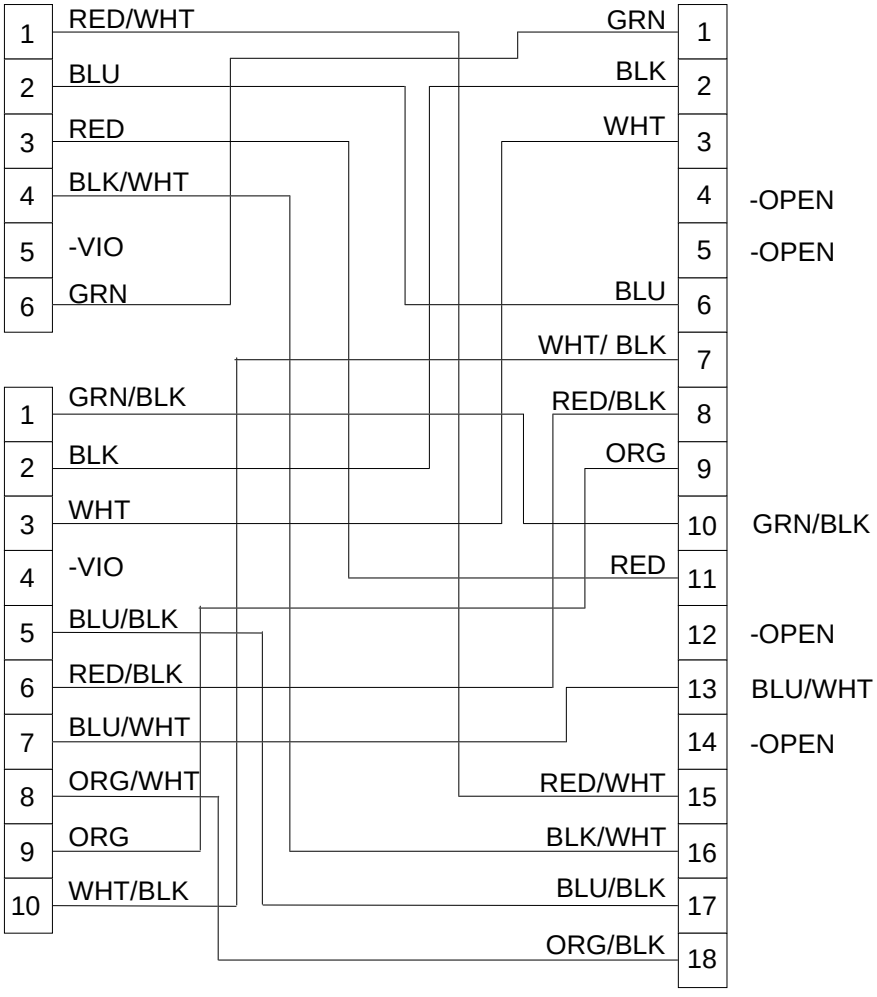
* LINKED BY JUMPER ON CABLE ASSY

APS Mother Board Cable Assembly (continued) (25.1005.0018)

RED 10-POS MTA 100 RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	GRN/BLK	22 AWG	GND
2	BLK	22 AWG	-15 V
3	WHT	22 AWG	+15 V
4	VIO	22 AWG	110 MODE*
5	BLU/BLK	22 AWG	START
6	RED/BLK	22 AWG	STANDBY
7	BLU/WHT	22 AWG	PWR SPLY OVR TEMP
8	ORG/BLK	22 AWG	I PRESS
9	ORG	22 AWG	SHORT
10	WHT/BLK	22 AWG	LAMP ON

*LINKED BY JUMPER ON CABLE ASSY



5.2.4 Yoke Cable Assembly (25.7019.0001)

Note: Side A contains the manufacturer's part number. Side B is blank

24 POS MT RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	SIDE A DESCRIPTION
1	BRN	24 AWG	DIG GND
2	RED	24 AWG	BULB OVR TEMP
3	ORG	24 AWG	MO 6A (LENS)
4	YEL	24 AWG	MO 6B (LENS)
5	GRN	24 AWG	V STEP
6	BLU	24 AWG	MO 5A (DIM IRIS)
7	VIO	24 AWG	MO 5B (DIM IRIS)
8	GRY	24 AWG	MO 4A (GOBO)
9	WHT	24 AWG	MO 4B (GOBO)
10	BLK	24 AWG	V STEP
11	RED/BLK	24 AWG	MO 3A (BEAM IRIS)
12	ORG/BLK	24 AWG	MO 3B (BEAM IRIS)
PIN	**WIRE COLOR**	**WIRE SIZE**	**SIDE B DESCRIPTION**
13	SHIELD	24 AWG	CHASSIS GND
14	RED/WHT	24 AWG	+15 V
15	ORG/WHT	24 AWG	MO 6C (LENS)
16	YLE/WHT	24 AWG	MO 6D (LENS)
17	GRN/WHT	24 AWG	V STEP
18	BLU/WHT	24 AWG	MO 5C (DIM IRIS)
19	VIO/WHT	24 AWG	MO 5D (DIM IRIS)
20	GRY/WHT	24 AWG	MO 4C (GOBO)
21	BRN/WHT	24 AWG	MO 4D (GOBO)
22	BLK/WHT	24 AWG	BLK/WHT
23	GRN/BLK	24 AWG	MO 3C (BEAM IRIS)
24	BLU/BLK	24 AWG	MO 3D (BEAM IRIS)

SPARE: YEL/BLK
SPARE: VIO/BLK

Yoke Cable Assembly (continued) (25.7019.0001)

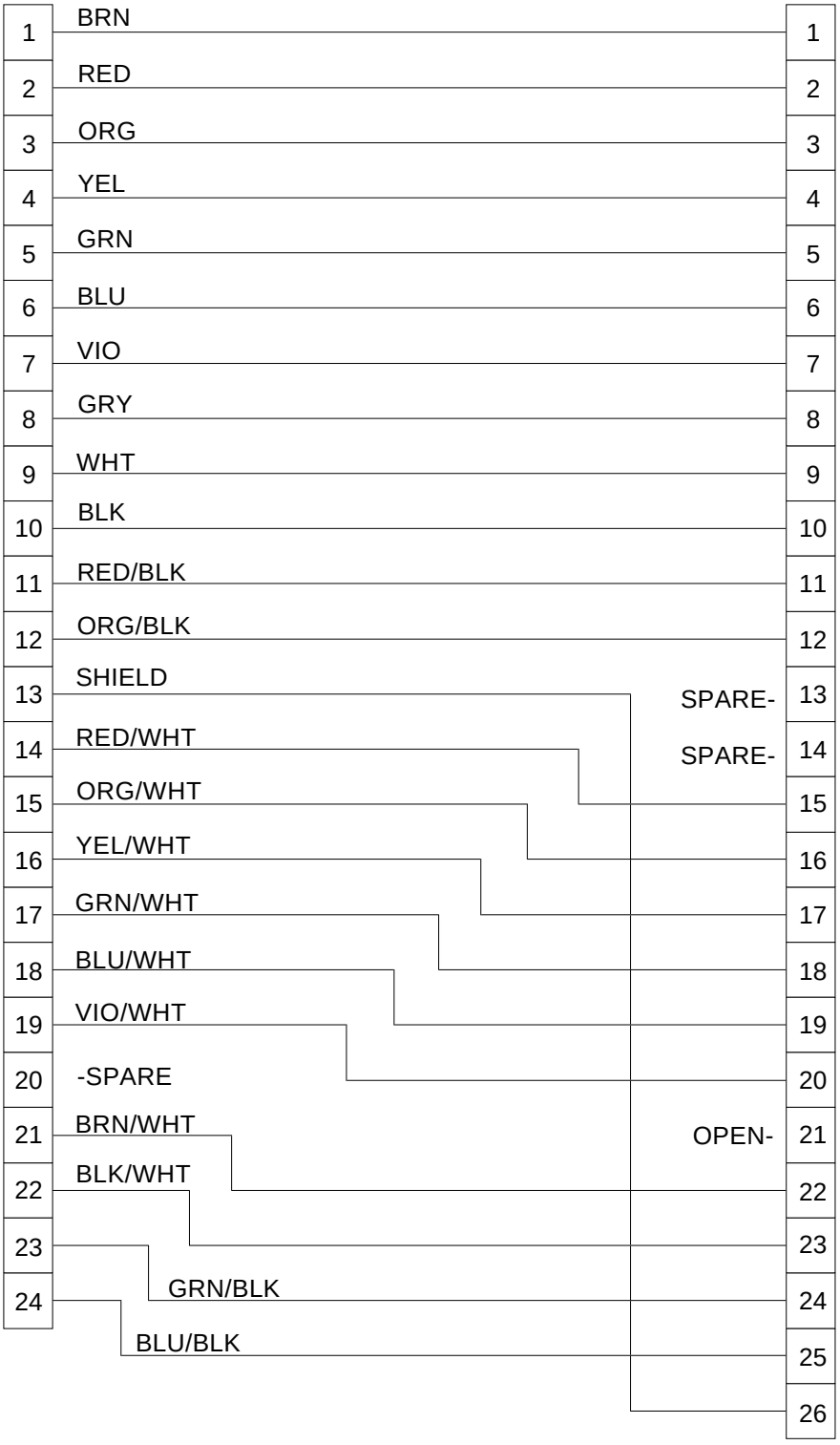
Note: Side A contains the manufacturer's part number. Side B is blank

26-POS MT RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	SIDE A DESCRIPTION
1	BRN	24 AWG	MO 2A (WH 1)
2	RED	24 AWG	MO 2B (WH 2)
3	ORG	24 AWG	V STEP
4	YEL	24 AWG	MO 1A (WH2)
5	GRN	24 AWG	MO 1B (WH 2)
6	BLU	24 AWG	IRIS EOT
7	VIO	24 AWG	WH 1 EOT
8	GRY	24 AWG	+5 V
9	WHT	24 AWG	TILT TACH VOLTS-
10	BLK	24 AWG	TILT ENC PHSE B
11	RED/BLK	24 AWG	TILT MOTOR VOLTS
12	ORG/BLK	24 AWG	ANALOG GND
13	YEL/BLK	24 AWG	CHASSIS GND
PIN	**WIRE COLOR**	**WIRE SIZE**	**SIDE B DESCRIPTION**
14	VIO/BLK	24 AWG	MO 2C (WH 1)
15	RED/WHT	24 AWG	MO 2D (WH 1)
16	ORG/WHT	24 AWG	V STEP
17	YEL/WHT	24 AWG	MO 1C (WH2)
18	GRN/WHT	24 AWG	MO 1D (WH2)
19	BLU/WHT	24 AWG	WH 2 EOT
20	VIO/WHT	24 AWG	GOBO EOT
21	N/C	24 AWG	+5 V
22	BRN/WHT	24 AWG	TILT TACH VOLTS+
23	BLK/WHT	24 AWG	TILT ENC PHSE A
24	GRN/BLK	24 AWG	TILT MOTOR VOLTS
25	BLU/BLK	24 AWG	ANALOG GND
26	SHIELD	24 AWG	CHASSIS GND

SPARE: GRY/WHT

Yoke Cable Assembly (continued) (25.7019.0001)



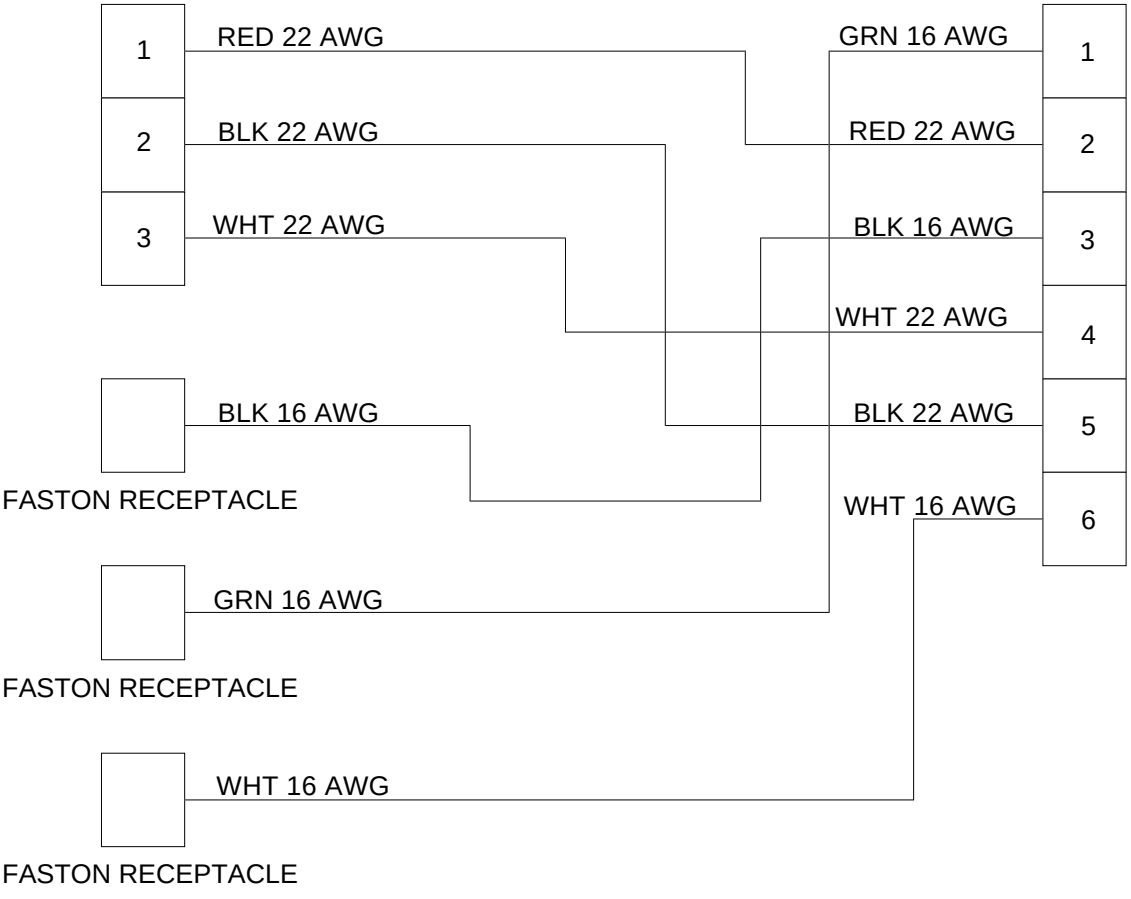
5.2.5 ACB-LPS Interconnect Cable Assembly (25.7024.00010)

6-POS MATE-N-LOK PLUG

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	GRN	16 AWG	GND
2	RED	22 AWG	20V
3	BLK	16 AWG	AC LINE IN
4	WHT	22 AWG	N/C
5	BLK	22 AWG	20V
6	WHT	16 AWG	AC LINE IN

RED 3-POS MTA 100 RECEPACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	22 AWG	
2	BLK	22 AWG	
3	WHT	22 WG	N/C



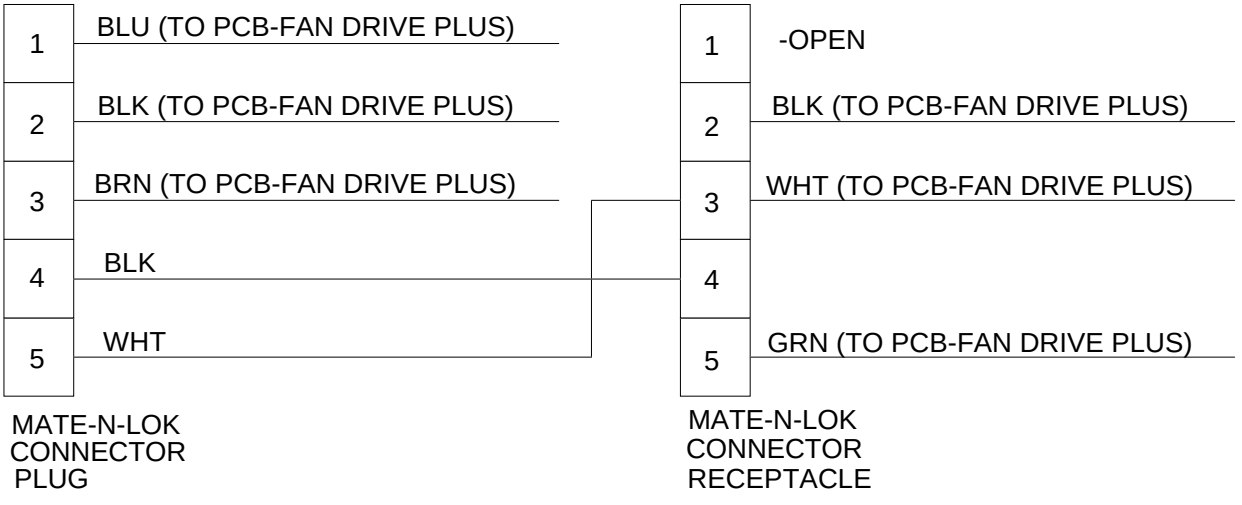
5.2.6 Fandrive Plus, 18" Cable Assembly (25.9623.163) (*VL2C* ONLY)

5-POS MATE-N-LOK PLUG

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	BLU	22 AWG	LO
2	BLK	22 AWG	HI
3	BRN	22 AWG	BLK
4	BLK	22 AWG	HRS
5	WHT	22 AWG	LO

5-POS MATE-N-LOK RECEPTACLE

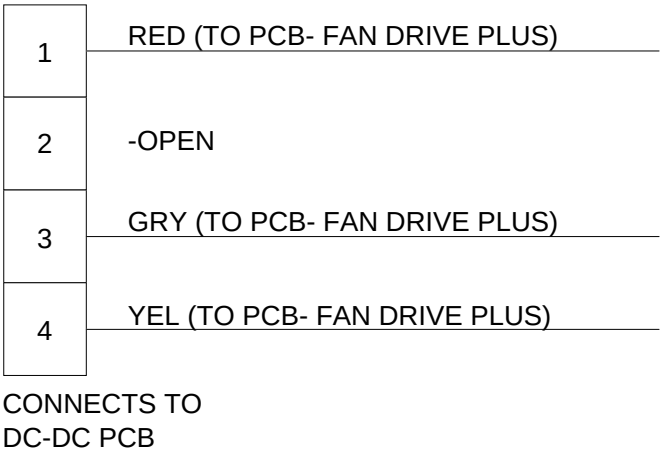
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C	22 AWG	
2	BLK	22 AWG	AC HI
3	WHT	22 AWG	AC LO
4	BLK	22 AWG	HRS
5	GRN	22 AWG	GND



5.2.7 Fan Drive DC Power Cable Assembly (25.9623.0197)

NATURAL 4-POS MTA 100 RECEPTACLE

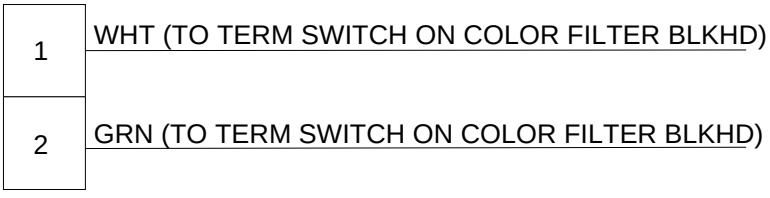
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	24 AWG	
2	N/C		
3	GRY	24 AWG	
4	YEL	24 AWG	



5.2.8 Yoke Termination Board Header Connector Pinouts (24.9621.0085)

RED 2-POS MTA 100 RECEPTACLE FROM BULB OVERTEMP SENSOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	16 AWG	DIG GND
2	GRN	16 AWG	BULB OVERTEMP



CONNECTS TO
YOKE CABLE TERM BOARD

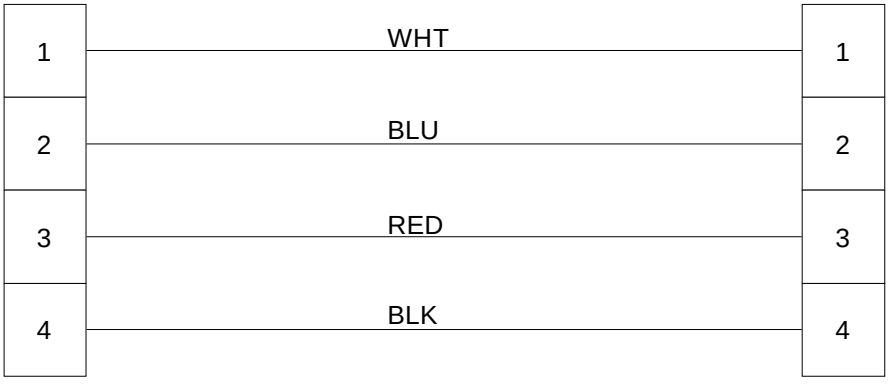
5.2.9 Tilt Cable Assembly (25.1010.1002)

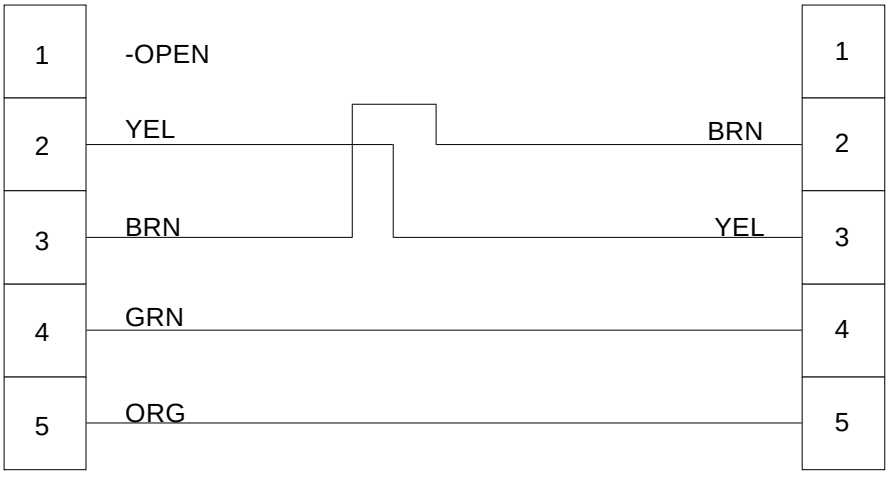
RED 4-POS MTA 100 RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	22 AWG	TILT TACH VOLTS+
2	BLU	22 AWG	TILT TACH VOLTS-
3	RED	22 AWG	TILT MOTOR VOLTS
4	BLK	22 AWG	TILT MOTOR GND

RED 5-POS MTA 100 RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C	22 AWG	CHASSIS GND
2	YEL	22 AWG	TILT ENC PHSE B
3	BRN	22 AWG	TILT ENC PHSE A
4	GRN	22 AWG	DIGITAL GND
5	ORG	22 AWG	+5V



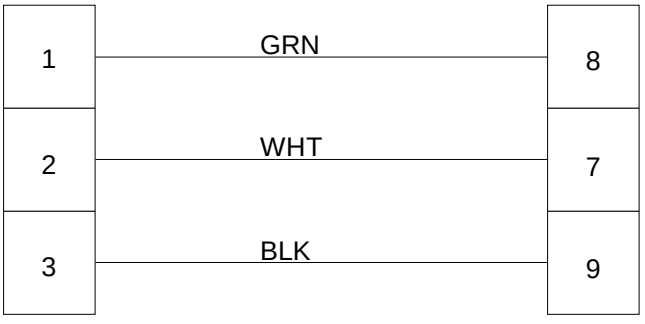


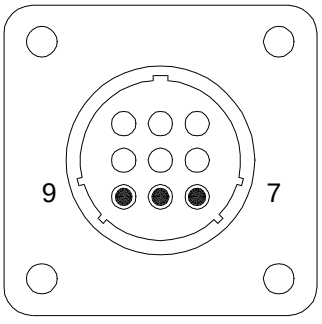
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5.2.10 AC Power Input Cable Assembly (25.1005.0003)

3-POS MATE-N-LOK RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	GRN	16 AWG	GND
2	WHT	16 AWG	AC LO
3	BLK	16 AWG	AC HI



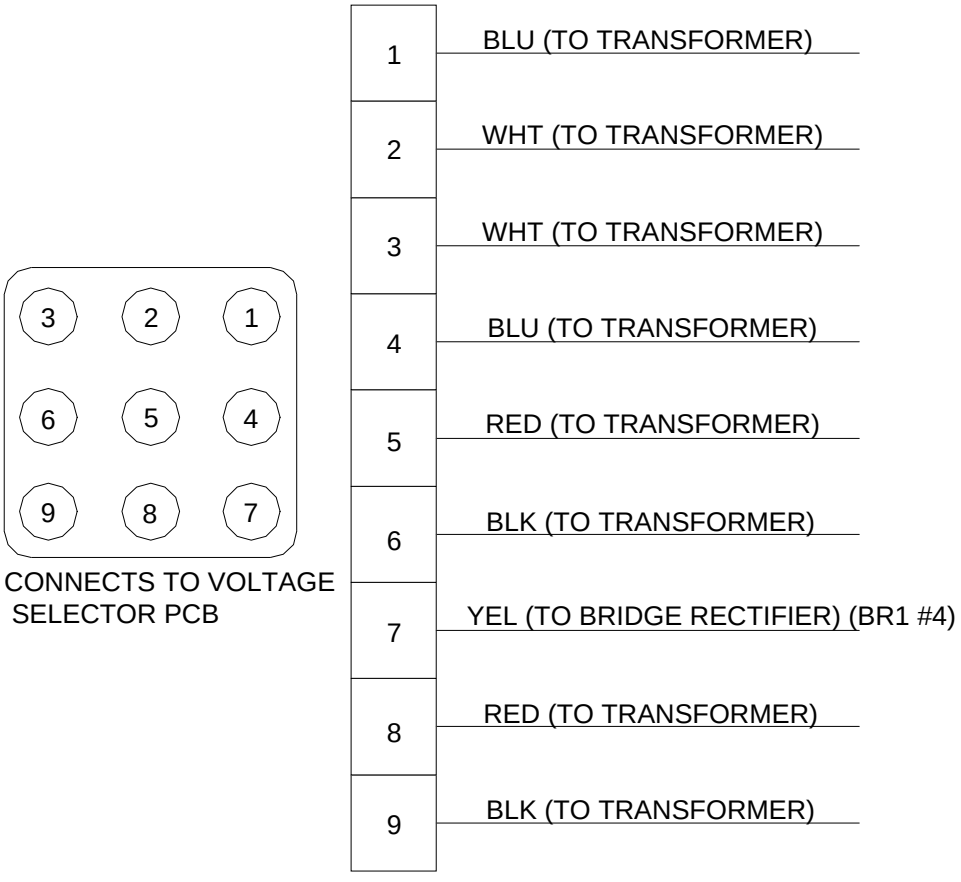


9-POS CHASSIS MOUNT
LAMP RECEPT. (52.6251.0001)

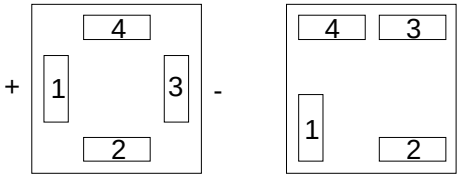
5.2.11 Transformer Assembly

9-POS MATE-N-LOK PLUG (52.6252.0001)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	BLU	16 AWG	GATE PWR
2	WHT	16 AWG	P2 LO
3	WHT	16 AWG	P1 LO
4	BLU	16 AWG	GATE PWR
5	RED	16 AWG	P2 T1
6	BLK	16 AWG	P1 HI
7	YEL	18 AWG	ZCR
8	RED	16 AWG	P2 T2
9	BLK	16 AWG	P2 HI



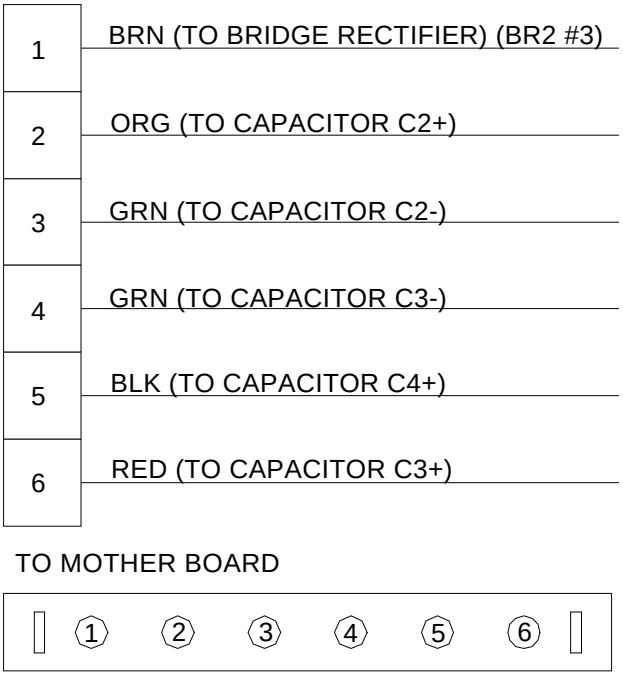
Note: 2 versions of bridge rectifiers



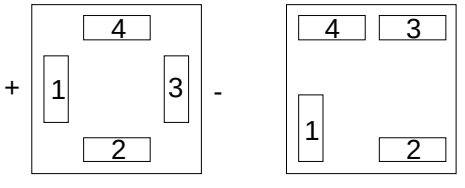
Transformer Assembly (continued)

6-POS MM INLINE PLUG (52.6254.0001)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	BRN	16 AWG	-10V
2	ORG	16 AWG	+10V
3	GRN	16 AWG	GND
4	GRN	16 AWG	GND
5	BLK	16 AWG	-30V
6	RED	16 AWG	+30V



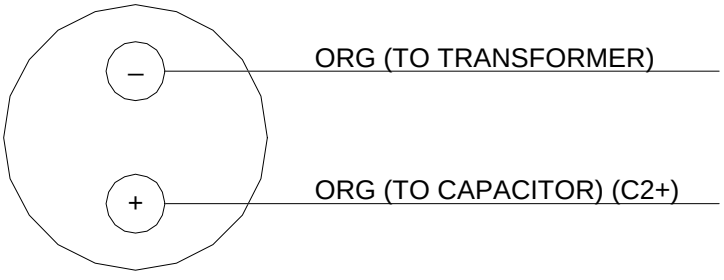
Note: 2 versions of bridge rectifiers



5.2.11.1 Capacitors

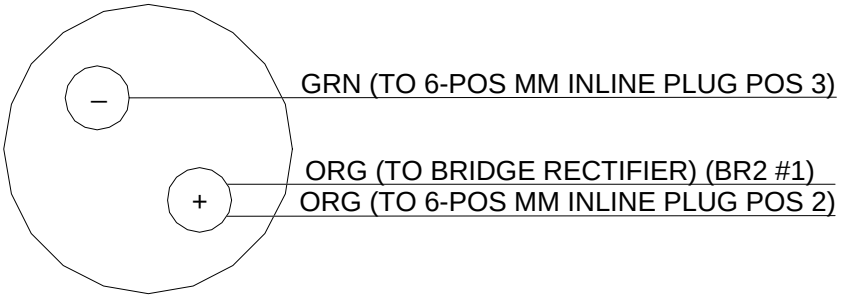
CAPACITOR 1 (C1)

POST	WIRE COLOR	WIRE SIZE	DESCRIPTION
+	ORG	16 AWG	
-	ORG	16 AWG	



CAPACITOR 2 (C2)

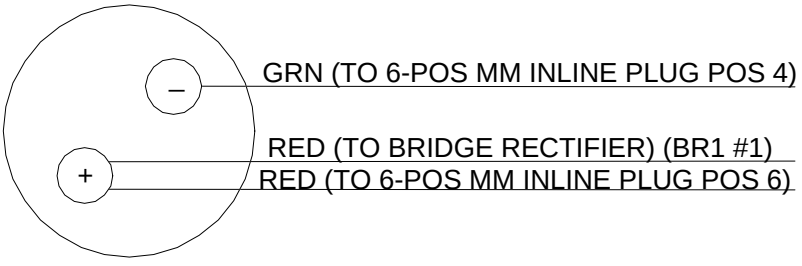
POST	WIRE COLOR	WIRE SIZE	DESCRIPTION
+	ORG	16 AWG	
+	ORG	16 AWG	
-	GRN	16 AWG	



Capacitors (continued)

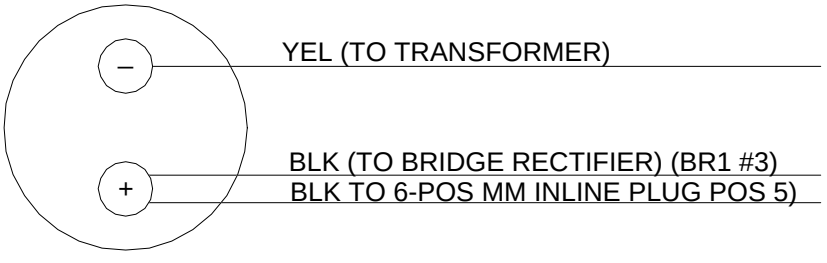
CAPACITOR 3 (C3)

POST	WIRE COLOR	WIRE SIZE	DESCRIPTION
+	RED	16 AWG	
+	RED	16 AWG	
-	GRN	16 AWG	



CAPACITOR 4 (C4)

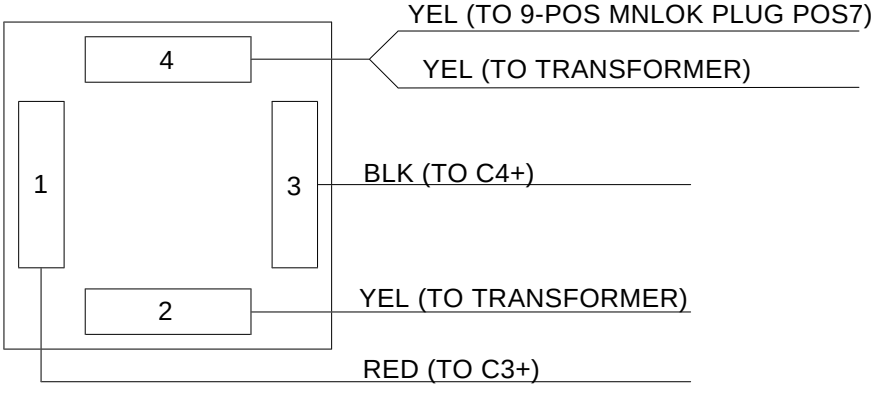
POST	WIRE COLOR	WIRE SIZE	DESCRIPTION
+	BLK	16 AWG	
+	BLK	16 AWG	
-	YEL	16 AWG	



5.2.11.2 Bridge Rectifier

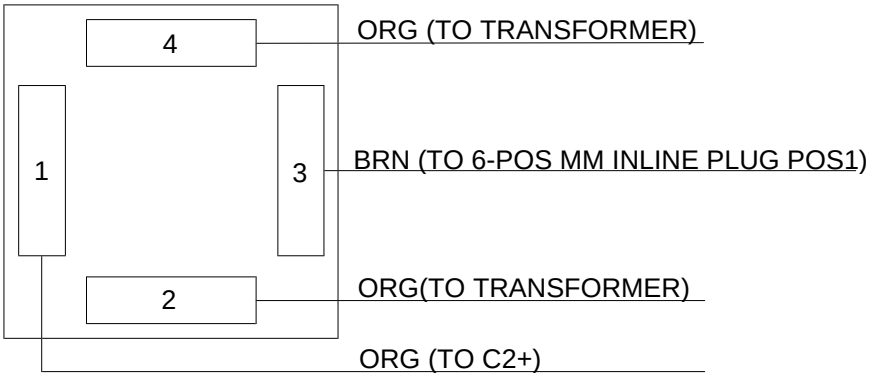
BRIDGE RECTIFIER 1 (BR1)

RECT	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	16 AWG	
2	YEL	16 AWG	
3	BLK	16 AWG	
4	YEL	18 AWG	
4	YEL	16 AWG	



BRIDGE RECTIFIER (BR2)

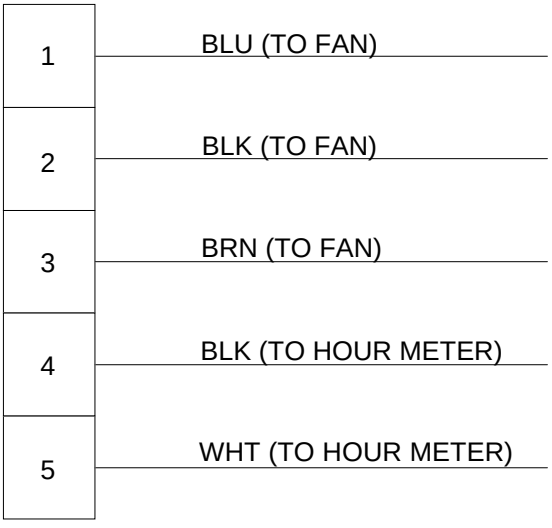
RECT	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	ORG	16 AWG	
2	BRN	16 AWG	
3	ORG	16 AWG	
4	ORG	16 AWG	



5.2.12 Motorized Fan

5-POS MATE-N-LOK RECEPTACLE

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	BLU		FAN
2	BLK		FAN
3	BRN		FAN AND HOUR METER
4	BLK		HOUR METER
5	WHT		HOUR METER



5.2.13 Thumbwheel Switch Cable Assembly (25.7020.0001)

THUMBWHEEL SWITCH (LSD)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED/WHT	22 AWG	
8	ORG/BLK	22 AWG	
C	BLU/WHT	22 AWG	
2	BLK/WHT	22 AWG	
4	BLU/BLK	22 AWG	

THUMBWHEEL SWITCH (CSD)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	GRN/BLK	22 AWG	
8	BLU	22 AWG	
C	GRN/WHT	22 AWG	
2	RED/BLK	22 AWG	
4	WHT/BLK	22 AWG	

THUMBWHEEL SWITCH (MSD)

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	ORG	22 AWG	
8	WHT	22 AWG	
C	BLK	22 AWG	
2	GRN	22 AWG	
4	RED	22 AWG	

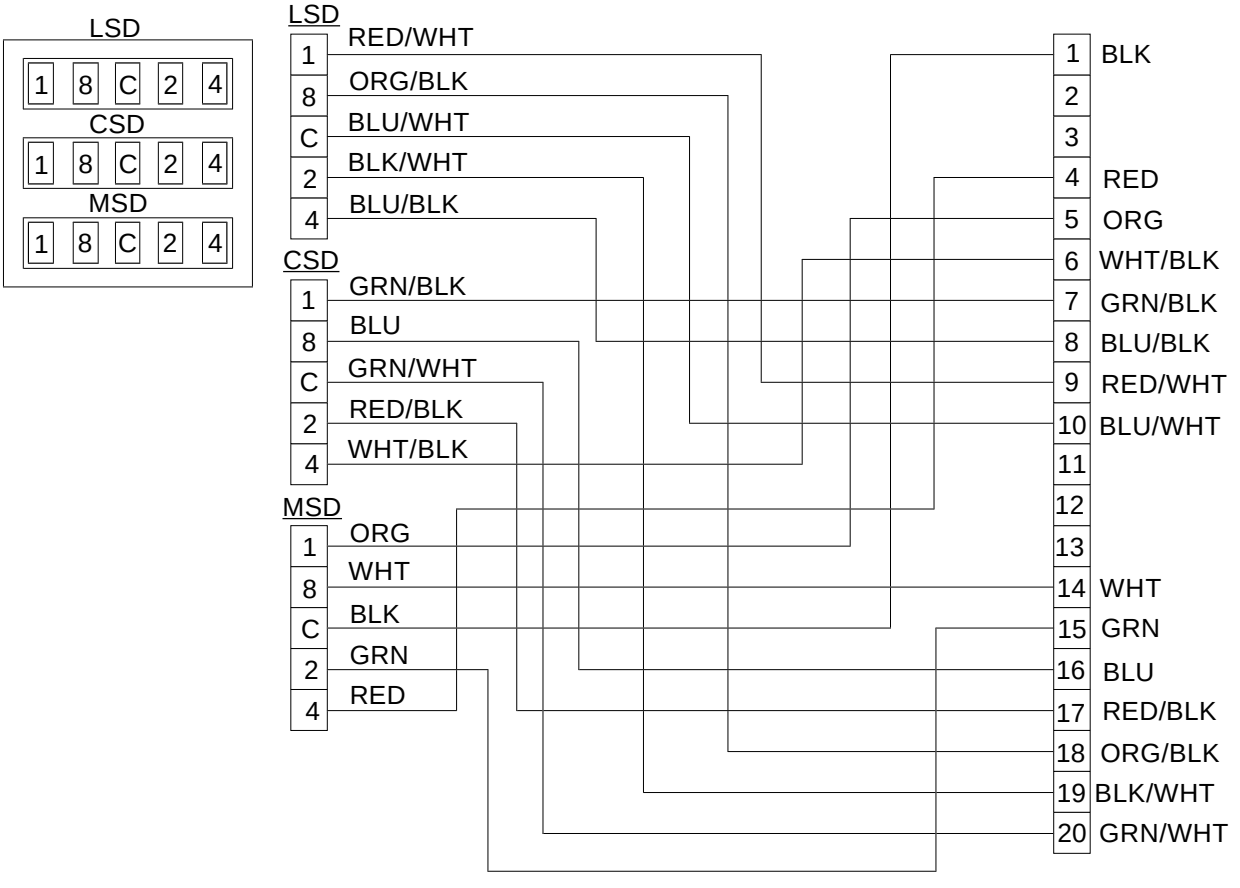
20-POS MOD-U CONNECTOR

PIN	WIRE COLOR	WIRE SIZE	SIDE A DESCRIPTION
1	BLK	15-CONDUCTOR	88
2	BLK	4-CONDUCTOR	-DATA IN
3	GRN	4-CONDUCTOR	-DATA OUT
4	RED	15-CONDUCTOR	MSD/4
5	ORG	15-CONDUCTOR	MSD/1
6	WHT/BLK	15-CONDUCTOR	CSD/4
7	GRN/BLK	15-CONDUCTOR	CSD/1
8	BLU/BLK	15-CONDUCTOR	LSD/4
9	RED/WHT	15-CONDUCTOR	LSD/1
10	BLU/WHT	15-CONDUCTOR	LSD GND

Thumbwheel Switch Cable Assembly (continued) (25.7020.0001)

20-POS MOD-U CONNECTOR (continued)

PIN	WIRE COLOR	WIRE SIZE	SIDE B DESCRIPTION
11	SHIELD	4-CONDUCTOR	DATA GND
12	RED	4-CONDUCTOR	+DATA IN
13	WHT	4-CONDUCTOR	+DATA OUT
14	WHT	15-CONDUCTOR	MSD/8
15	GRN	15-CONDUCTOR	MSD/2
16	BLU	15-CONDUCTOR	CSD/8
17	RED/BLK	15-CONDUCTOR	CSD/2
18	ORG/BLK	15-CONDUCTOR	LSD/8
19	BLK/WHT	15-CONDUCTOR	LSD/2
20	GRN/WHT	15-CONDUCTOR	CSD GND



5.2.14 Motor Connectors

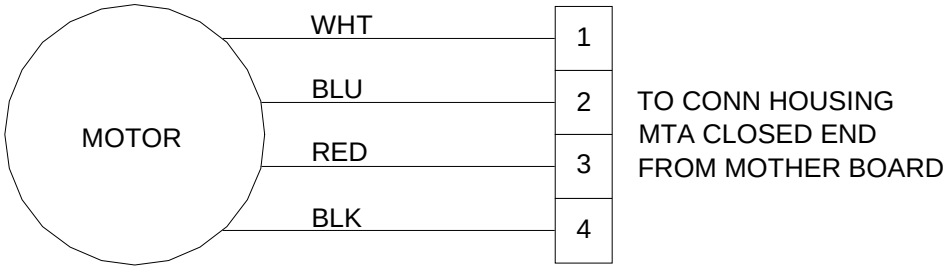
5.2.14.1 Pan/Tilt Motor (10.9620.0107)

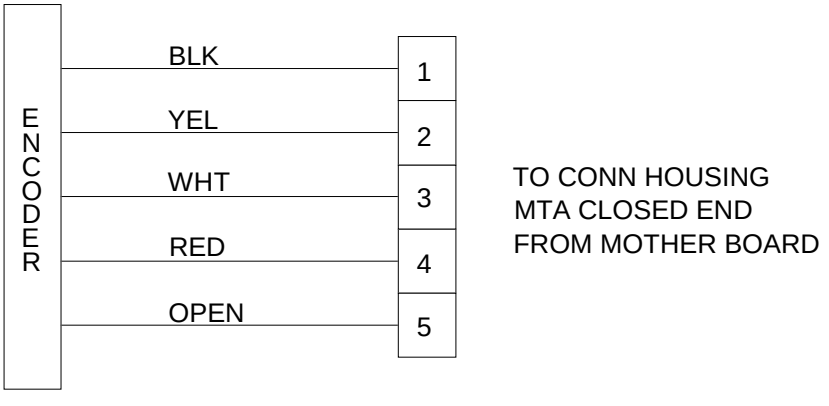
RED 4-POS MTA 100 HEADER

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	22 AWG	PAN TACH+
2	BLU	22 AWG	PAN TACH-
3	RED	22 AWG	PAN MOTOR VOLTS
4	BLK	22 AWG	PAN MOTOR GND

RED 5-POS MTA 100 HEADER

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	BLK	22 AWG	PAN ENC PHASE A
2	YEL	22 AWG	PAN ENC PHASE B
3	WHT	22 AWG	PAN ENCODER GND
4	RED	22 AWG	+5 V
5	N/C		

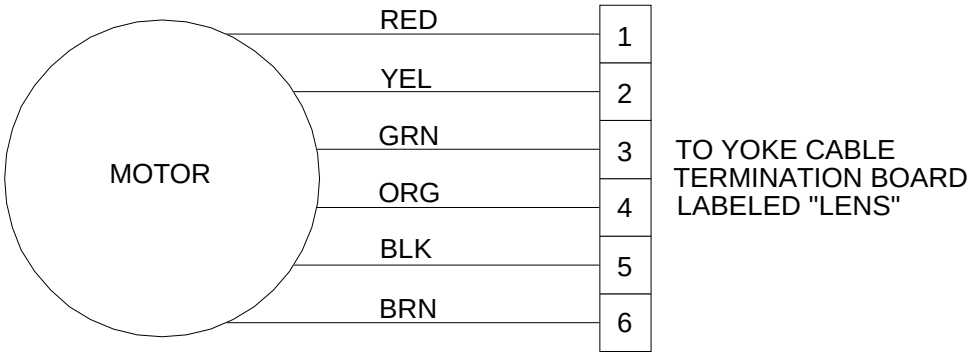




5.2.14.2 Yoke Termination Board Motors

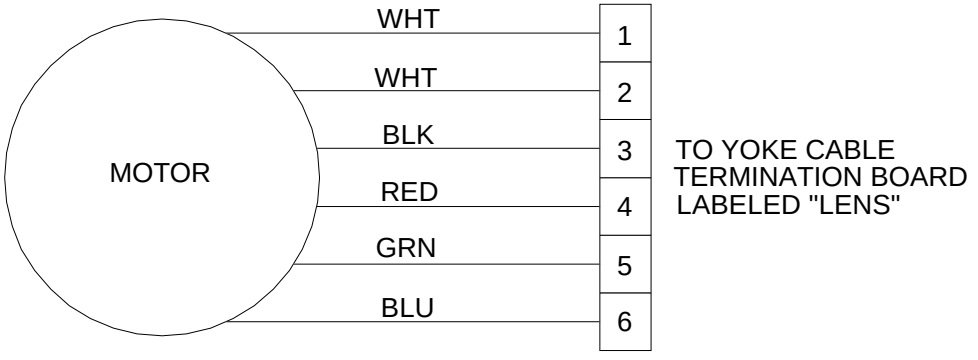
GRN 6-POS MTA 100 RECEPTACLE FROM ***VL2B*** FOCUS LENS ACTUATOR MOTOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	24 AWG	
2	YEL	24 AWG	
3	GRN	24 AWG	
4	ORG	24 AWG	
5	BLK	24 AWG	
6	BRN	24 AWG	



GRN 6-POS MTA 100 RECEPTACLE FROM ***VL2C*** FOCUS LENS ACTUATOR MOTOR

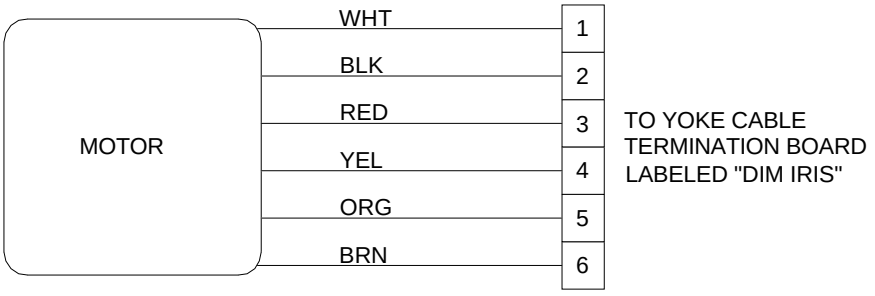
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	24 AWG	
2	WHT	24 AWG	
3	BLK	24 AWG	
4	RED	24 AWG	
5	GRN	24 AWG	
6	BLU	24 AWG	



Yoke Termination Board Motors (continued)

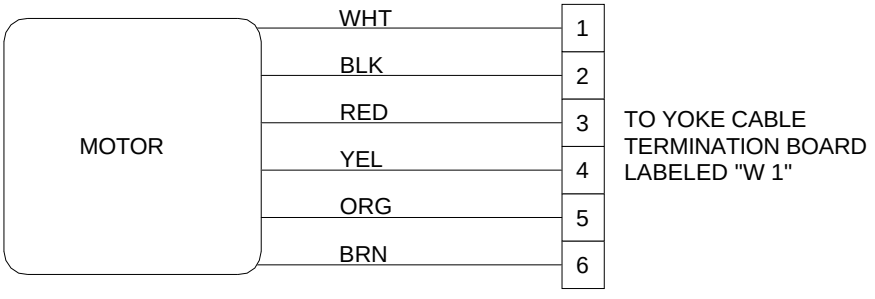
WHT 6-POS MTA RECEPTACLE FROM BRIGHTNESS IRIS MOTOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	24 AWG	
2	BLK	24 AWG	
3	RED	24 AWG	
4	YEL	24 AWG	
5	ORG	24 AWG	
6	BRN	24 AWG	



WHT 6-POS MTA 100 RECEPTACLE FROM WHEEL 1 MOTOR

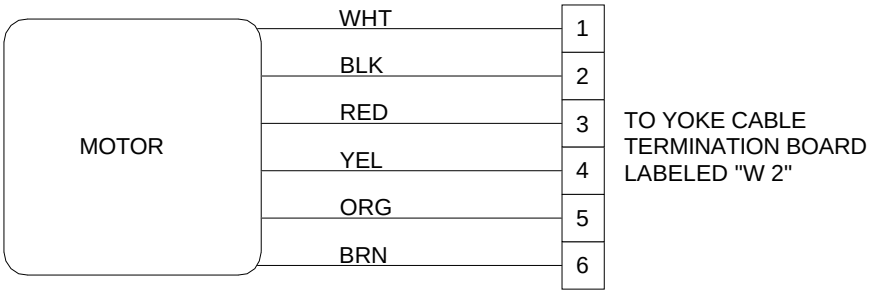
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	24 AWG	
2	BLK	24 AWG	
3	RED	24 AWG	
4	YEL	24 AWG	
5	ORG	24 AWG	
6	BRN	24 AWG	



Yoke Termination Board Motors (continued)

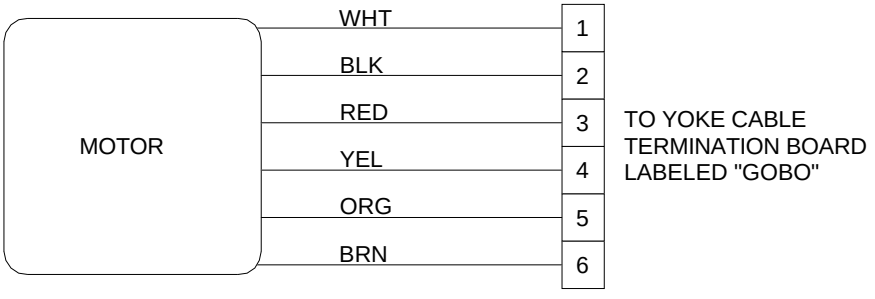
WHT 6-POS MTA 100 RECEPTACLE FROM WHEEL 2 MOTOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	24 AWG	
2	BLK	24 AWG	
3	RED	24 AWG	
4	YEL	24 AWG	
5	ORG	24 AWG	
6	BRN	24 AWG	



WHT 6-POS MTA 100 RECEPTACLE FROM GOBO WHEEL MOTOR

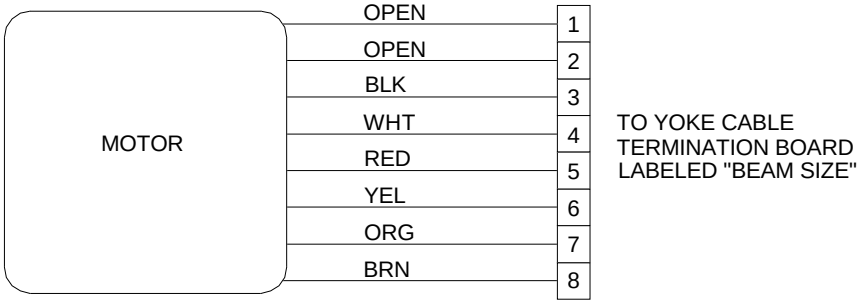
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	WHT	24 AWG	
2	BLK	24 AWG	
3	RED	24 AWG	
4	YEL	24 AWG	
5	ORG	24 AWG	
6	BRN	24 AWG	



Yoke Termination Board Motors (continued)

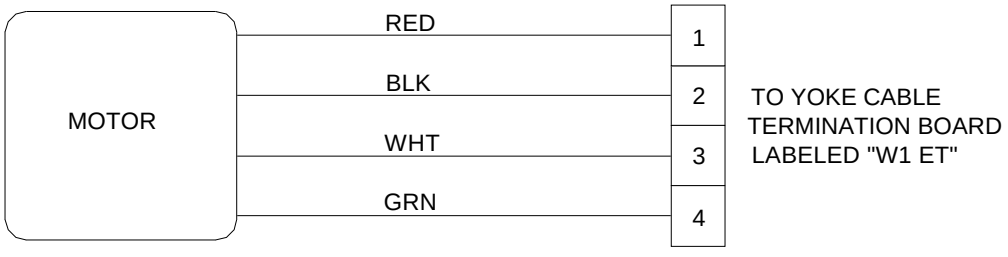
BLU 8-POS MTA 100 RECEPTACLE FROM BEAM SIZE IRIS MOTOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C	24 AWG	
2	N/C	24 AWG	
3	BLK	24 AWG	
4	WHT	24 AWG	
5	RED	24 AWG	
6	YEL	24 AWG	
7	ORG	24 AWG	
8	BRN	24 AWG	



BLU 4-POS MTA 100 RECEPTACLE FROM WHEEL 1 EOT SENSOR

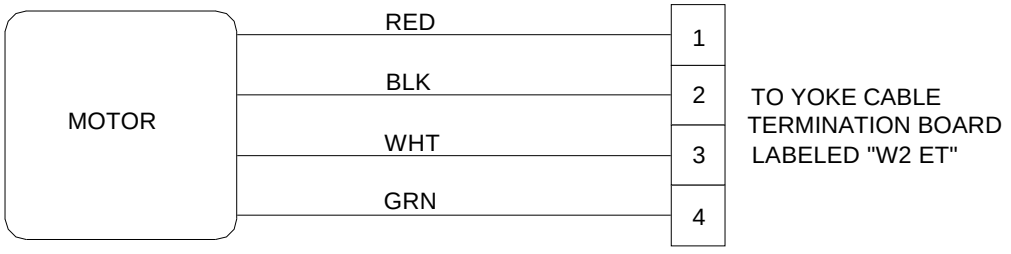
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	24 AWG	
2	BLK	24 AWG	
3	WHT	24 AWG	
4	GRN	24 AWG	



Yoke Termination Board Motors (continued)

BLU 4-POS MTA 100 RECEPTACLE FROM WHEEL 2 EOT SENSOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	24 AWG	
2	BLK	24 AWG	
3	WHT	24 AWG	
4	GRN	24 AWG	



RED 4-POS MTA 100 RECEPTACLE FROM GOBO WHEEL EOT SENSOR

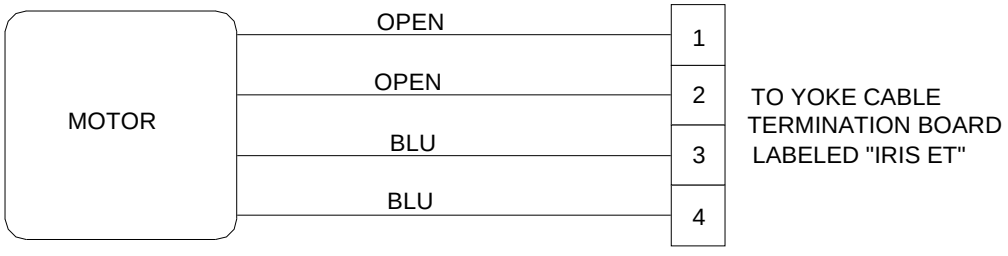
PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	RED	24 AWG	
2	BLK	24 AWG	
3	WHT	24 AWG	
4	GRN	24 AWG	



Yoke Termination Board Motors (continued)

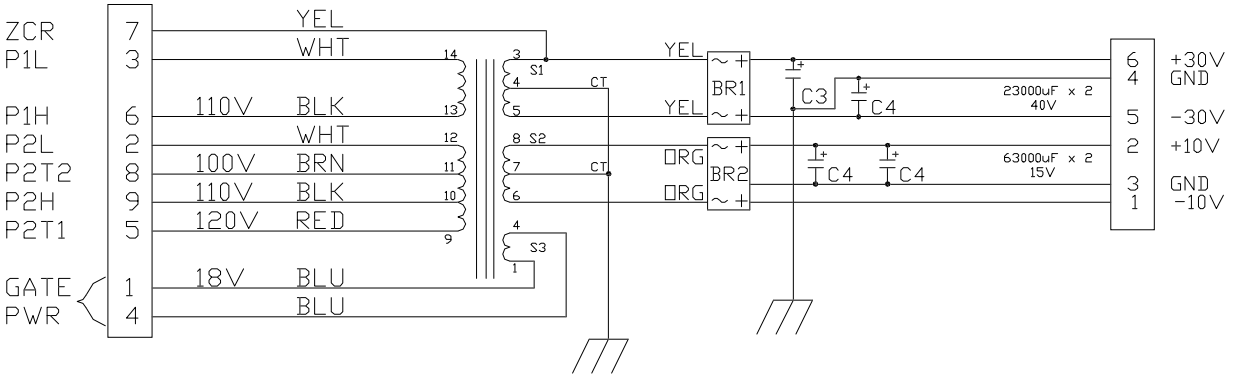
RED 4-POS MTA 100 RECEPTACLE FROM BRIGHTNESS IRIS EOT SENSOR

PIN	WIRE COLOR	WIRE SIZE	DESCRIPTION
1	N/C	24 AWG	
2	N/C	24 AWG	
3	BLU	24 AWG	
4	BLU	24 AWG	



5.3 Schematics and Wiring Diagrams

5.3.1 Transformer Schematic



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